

CORNELL UNIVERSITY OFFICIAL PUBLICATION

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Number 12

Announcement of the Thirty-Seventh

Summer Session

1928

June 30—August 10

Ithaca, New York

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March 1, 1928

ANNOUNCEMENT OF THE SUMMER SESSION

This pamphlet is designed to give prospective students complete information about the Summer Session of Cornell University. On the last page there is a list of other publications which describe the courses of study offered during the regular academic year by the several colleges and schools of the University.

SUMMER SESSION OF THE LAW SCHOOL

See page 50 for information about the summer courses in Law to be given at Cornell University in 1928.

THE SUMMER SCHOOL OF BIOLOGY

See page 51 for information about the summer courses in Biology to be given at Cornell University in 1928.

THE NEW YORK STATE SUMMER SESSION AT CORNELL UNIVERSITY

See page 57 for information about the summer courses in Agriculture and in Home Economics to be given at Cornell University in 1928.

OFFICE AT GOLDWIN SMITH 252

The office of the Summer Session is in Room 252, Goldwin Smith Hall. This office will be open as a bureau of information on registration day from 9 A. M. till 1 P. M. and from 2 till 5 P. M., and thereafter, throughout the session, daily except Saturday from 9 till 12:30 and from 2 till 4.

Members of the staff of instruction may be consulted at their offices on Monday, July 2.

THE SESSION MUST BEGIN PROMPTLY

In order to get the full number of exercises announced for the session, it is necessary that all work begin promptly on Monday morning, July 2. Students are urged to reach Ithaca in time to be present at the first exercise of each class. They should, if possible, register on Saturday, June 30; if not, then on Monday, July 2, in an hour not occupied by class work.

THE CALENDAR

SUMMER SESSION OF 1928

THE FIRST TEN DAYS

June 30, Saturday, 8 A. M.-5 P. M.	Registration, <i>Room A, Goldwin Smith Hall.</i>
July 2, Monday.....	Instruction begins at the time and place announced for each course. Registration is continued in the Registrar's Office, <i>Morrill Hall</i>
July 3, Tuesday evening.....	Organ Recital, <i>Sage Chapel.</i>
July 5, Thursday evening.....	Piano Recital.
July 6, Friday, until 4 P. M.....	Last day for payment of fees at the Treasurer's office, <i>1 Morrill Hall.</i>
July 8, Sunday, 11 A. M.....	Public Worship and Sermon in <i>Sage Chapel.</i>
July 8, Sunday evening.....	Organ Recital, <i>Bailey Hall.</i>
July 9, Monday evening.....	Lecture Course.

THE REGULAR WEEKLY SCHEDULE

Sunday, 11 A. M.	Public Worship and Sermon, <i>Sage Chapel.</i>	(Beginning July 8.)
Sunday evening,	Organ Recital, <i>Bailey Hall.</i>	(Beginning July 8.)
Monday evening,	Lecture Course.	(Beginning July 9.)
Tuesday evening,	Organ Recital, <i>Sage Chapel.</i>	(Beginning July 3.)
Wednesday evening,	Departmental Lectures and Conferences.	(Beginning July 4.)
Thursday evening,	Lecture-Recital.	(Beginning July 5.)
Friday evening,	Plays by Summer Theater Company.	(Beginning July 6.)
Saturday evening,	Plays by Summer Theater Company.	(Beginning July 7.)

CONCERTS

Friday evening: Concert.	<i>Bailey Hall.</i>	Artist to be announced.
Friday evening: Concert.	<i>Bailey Hall.</i>	Artist to be announced.

THE LAST DAY

August 10, Friday.....	Summer Session ends.
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THE WEEKLY CALENDAR

The WEEKLY CALENDAR of the University carries announcements of all public exercises held in connection with the Summer Session. It is posted on the bulletin boards.

CORNELL UNIVERSITY

THE SUMMER SESSION OF 1928

OFFICERS

The President of the University

LIVINGSTON FARRAND, A.B., M.D., L.H.D., LL.D.

ADMINISTRATIVE BOARD

Executive Committee

RIVERDA HARDING JORDAN, Ph.D., *Chairman*

BENTON SULLIVAN MONROE, Ph.D., *Secretary*

ROLLINS ADAMS EMERSON, D.Sc., *Dean of the Graduate School*

DEXTER SIMPSON KIMBALL, M.E., *Dean of the College of Engineering*

ROBERT MORRIS OGDEN, Ph.D., *Dean of the College of Arts and Sciences*

ROLLAND MACLAREN STEWART, Ph.D., *Director, New York State Summer Session*

The Registrar

DAVID FLETCHER HOY, M.S.

The Dean of Women

R. LOUISE FITCH, A.M.

STAFF OF INSTRUCTION

(The names of the instructors in the New York State Summer Session at Cornell University are printed on pages 60-62; those of the instructors in the Summer Session of the Law School, on page 50; those of the instructors in the Summer School of Biology, on page 51.)

JOSEPH QUINCY ADAMS, Ph.D., Litt.D.	English
(Professor of English)	
RALPH PALMER AGNEW, A.M.	Mathematics
(Instructor in Mathematics)	
WILLIAM L. ANDERSON, M.D.	Physical Education
(Supervisor of Physical Training, Stuyvesant High School, New York)	
ALBERT LEROY ANDREWS, Ph.D.	German
(Assistant Professor of German)	
ELIZABETH BAKER, A.B.	Geology
(Assistant in Geology)	
DANE LEWIS BALDWIN, M.A.	English
(Instructor in English)	
DOROTHY HAMMOND BATEMAN	Physical Education
(Instructor in Physical Education)	
BEN RAYMOND BEISEL, B.S.	Mathematics
(Instructor in Mathematics)	
MORRIS GILBERT BISHOP, Ph.D.	French
(Assistant Professor of the Romance Languages and Literatures)	
SAMUEL LATIMER BOOTHROYD, B.S.	Astronomy
(Professor of Astronomy and Geodesy)	
HENRY E. BOURNE, B.D., L.H.D.	History
(Professor of History, Western Reserve University)	
JULIAN PLEASANT BRETZ, Ph.D.	History
(Professor of American History)	
THOMAS ROLAND BRIGGS, Ph.D.	Chemistry
(Professor of Physical Chemistry and Electro-Chemistry)	

KENNETH WILLIAM BRITT.....	Chemistry
(Assistant in Chemistry)	
WENDELL S. BROOKS, Ph.D.....	Education
(President of Courier College, Chicago)	
ARTHUR WESLEY BROWNE, Ph.D.....	Chemistry
(Professor of Inorganic and Analytical Chemistry)	
WILLIAM F. BRUCE, Ph.D.....	Education
(Instructor in Education)	
EARLE NELSON BURROWS, M. C. E.....	Structural Engineering
(Assistant Professor of Structural Engineering)	
LEON FELIPE CAMINO, Licenciado En Ciencias.....	Spanish
(Instructor in Romance Languages)	
HARRY CAPLAN, Ph.D.....	Greek
(Assistant Professor of Classics)	
WALTER BUCKINGHAM CARVER, Ph.D.....	Mathematics
(Professor of Mathematics)	
CARROLL DUNHAM CHAMPLIN, Ph.D.....	Education
(Professor of Education, Pennsylvania State College)	
RAYMOND G. CLAPP, Ph.B., M.D.....	Physical Education
(Professor of Physical Education, University of Nebraska)	
COLLIER COBB, Ph.D.....	Geology
(Professor of Geology, Head of Department of Geology, University of North Carolina)	
JACOB ROLAND COLLINS, Ph.D.....	Physics
(Assistant Professor of Physics)	
CLYDE FIRMAN CRAIG, Ph.D.....	Mathematics
(Assistant Professor of Mathematics)	
GUSTAVUS WATTS CUNNINGHAM, Ph.D., Litt.D.....	Philosophy
(Professor of Philosophy)	
GEORGE IRVING DALE, Ph.D.....	Spanish
(Professor of Romance Languages)	
ROY JOSEPH DEFERRARI, M.A., Ph.D.....	Latin
(Professor of Latin and Associate Professor of Greek, Catholic University of America, Washington, D. C.)	
ALFRED LAURENCE DRESSER, B.S.....	Chemistry
(Assistant in Chemistry)	
ALEXANDER M. DRUMMOND, A.M.....	Public Speaking
(Professor of Public Speaking)	
CHARLES LOVE DURHAM, Ph.D., Litt.D.....	Latin
(Professor of Latin)	
JENNETTE EVANS, M.D.....	Hygiene
(Assistant Professor of Hygiene and Medical Adviser of Women)	
ALBERT BERNHARDT FAUST, Ph.D.....	German
(Professor of German)	
SAMUEL FELDMAN, Ph.D.....	Psychology
(Instructor in Psychology)	
FRANK SAMUEL FREEMAN, Ed.D.....	Education
(Instructor in Education)	
SEYMOUR STANTON GARRETT, C. E.....	Mechanics of Engineering
(Professor of Mechanics of Engineering)	
JEAN M. GELAS.....	Physical Education
(Instructor in Physical Education, Hamilton College)	
ROSWELL CLIFTON GIBBS, Ph.D.....	Physics
(Professor of Physics)	
DAVID CLINTON GILLESPIE, Ph.D.....	Mathematics
(Professor of Mathematics)	
ADRIAN G. GOULD, M.D.....	Physical Education
(Assistant Professor of Hygiene and Assistant Medical Adviser)	
GUY SHEPARD GREENE, Ph.D.....	English
(Assistant Professor of English, University of Pittsburgh)	

THE SUMMER SESSION

HARRY HELSON, Ph.D.	Psychology
(Assistant Professor of Psychology, University of Kansas)	
FRANK HEYWOOD HODDER, Ph.M.	History
(Professor of American History, University of Kansas)	
MARVIN THEODORE HERRICK, Ph.D.	Public Speaking
(Assistant Professor of Public Speaking, University of Illinois)	
LOUIS BENJAMIN HOISINGTON, Ph.D.	Psychology
(Assistant Professor of Psychology)	
PAUL T. HOMAN, Ph.D.	Economics
(Assistant Professor of Economics)	
HARRY JAMES HOSKING, B.S.	Chemistry
(Instructor in Chemistry)	
HARLEY EARL HOWE, Ph.D.	Physics
(Assistant Professor of Physics)	
EVERETT LEE HUNT, A.B.	Public Speaking
(Professor of Public Speaking, Swarthmore College)	
WALLIE ABRAHAM HURWITZ, Ph.D.	Mathematics
(Professor of Mathematics)	
JOHN IRWIN HUTCHINSON, Ph.D.	Mathematics
(Professor of Mathematics)	
RALPH LENT JEFFERY, A.M.	Mathematics
(Instructor in Mathematics)	
JOHN RAVEN JOHNSON, Ph.D.	Chemistry
(Assistant Professor of Organic Chemistry)	
RIVERDA HARDING JORDAN, Ph.D.	Education
(Professor of Education)	
WILLIAM ROSS JUNKIN, A.B.	Economics
(Instructor in Economics)	
MARCEL KESSEL, A.B.	English
(Instructor in English)	
HORACE KIDGER, A.B., A.M., LL.B.	Social Science
(Head of Department of Social Studies, Newton, Mass., High School)	
GEORGE KREEZER, A.B.	Psychology
(Instructor in Psychology)	
MAX LUDWIG WOLFRAM LAISTNER, M.A.	History
(Professor of Ancient History)	
HARRY IVES LANE, A.M.	Mathematics
(Instructor in Mathematics)	
HENRY LEIGHTON, A.B.	Geology
(Professor of Geology, University of Pittsburgh)	
BERNARD LENROW, A.B.	Public Speaking
(Instructor in Public Speaking)	
ALBERT LEREBELLER, Licencié ès lettres	French
(French Master, Culver Military Academy, Culver, Ind.)	
ROBERT EDWARD LOVING, Ph.D.	Physics
(Acting Professor of Physics)	
ROBERT ALEXANDER MACKAY, Ph.D.	Government
(Eric Dennis Memorial Professor of Government and Political Science, Dalhousie University, Halifax)	
ASA EMANUEL MCKINNEY, Ph.D.	Chemistry
(Assistant Professor of Chemistry)	
EMMETT B. McNATT, A.B.	Economics
(Instructor in Economics)	
FREDERICK GEORGE MARCHAM, Ph.D.	English History
(Instructor in English History)	
CLYDE WALTER MASON, Ph.D.	Chemistry
(Assistant Professor of Chemistry)	
JAMES FREDERICK MASON, Ph.D.	French
(Professor of the Romance Languages and Literatures)	

EDWARD GOULD MEAD	Music
(Acting Assistant Professor of Music)	
BENTON SULLIVAN MONROE, Ph.D.	English
(Assistant Professor of English)	
CLYDE B. MOORE, Ph.D.	Education
(Professor of Rural Education)	
GUY BROOKS MUCHMORE, A.B.	Public Speaking
(Assistant Professor of Public Speaking)	
ALBERT S. MULLER, B.S.	Physical Education
MAURICE JACKSON MURRAY, A.B.	Chemistry
(Assistant in Chemistry)	
MELVIN L. NICHOLS, B.Chem., Ph.D.	Chemistry
(Assistant Professor of Chemistry)	
CLARK SUTHERLAND NORTHUP, Ph.D.	English
(Professor of English and Librarian of the Hart Memorial Library)	
CHARLES E. O'ROURKE, C.E.	Engineering
(Assistant Professor of Structural Engineering)	
ELMER PENDELL, M.A.	Economics
(Instructor in Economics)	
HAROLD CHARLES PERKINS, M.E.	Mechanics
(Assistant Professor of Mechanics)	
EARL WALTER PHELAN, B.Chem.	Chemistry
(Assistant in Chemistry)	
MILES ALBION POND, Ph.B.	Descriptive Geometry
(Assistant Professor of Civil Engineering)	
LAURENCE PUMPELLY, Ph.D.	French
(Professor of the Romance Languages and Literatures)	
ROBERT REDFIELD, Ph.B., J. D.	Economics
(Instructor in Anthropology, University of Chicago)	
HAROLD LYLE REED, Ph.D.	Economics
(Professor of Economics and Finance)	
ERNEST WILLIAM RETTGER, Ph.D.	Mechanics
(Professor of Mechanics of Engineering)	
ASHLEY ROBEY, M.S.	Chemistry
(Assistant in Chemistry)	
FRED STILLMAN ROGERS, M.E.	Kinematics
(Professor of Machine Design)	
PAUL PATRICK ROGERS, A.M.	Spanish
(Instructor in Spanish)	
JESSE PERRY ROWE, Ph.D.	Geology
(Professor of Geology, University of Montana)	
WILLIAM CARL RUEDIGER, Ph.D.	Education
(Dean, Teachers College, George Washington University)	
MARTIN W. SAMPSON, M.A.	English
(Goldwin Smith Professor of English Literature)	
CHARLES HAMILTON SAYLOR, B.Chem.	Chemistry
(Assistant in Chemistry)	
ERNEST WILLIAM SCHODER, Ph.D.	Hydraulics
(World War Memorial Professor of Experimental Hydraulics)	
HOWARD LESTER SCHUG, B.S. in E.E.	Mathematics
(Instructor in Mathematics)	
HERBERT H. SCOFIELD, M.E.	Engineering
(Professor of Testing Materials)	
FRANCIS ROBERT SHARPE, Ph.D.	Mathematics
(Professor of Mathematics)	
ROBERT PELTON SIBLEY, M.A., L.H.D.	English
(Secretary of the College of Arts and Sciences)	
HAROLD ROBERT SMART, Ph.D.	Philosophy
(Assistant Professor of Philosophy)	

DEAN FRANKLIN SMILEY, M.D.	Hygiene
(Assistant Professor of Hygiene and Medical Adviser)	
VIRGIL SNYDER, Ph.D.	Mathematics
(Professor of Mathematics)	
WALTER HUTCHINSON STANTON, Ph.D.	Public Speaking
(Instructor in Public Speaking, Dartmouth College)	
FORREST F. STARK	Drawing and Painting
(Instructor in the Pennsylvania Academy of Fine Arts)	
WALTER KING STONE	Drawing and Painting
(Assistant Professor of Drawing)	
MARCELLUS H. STOW, M.A.	Geology
(Assistant Professor of Geology, Washington and Lee University)	
WILLIAM STRUNK, jr., Ph.D.	English
(Professor of English)	
WILLIAM FRANCIS GRAY SWANN, D. Sc.	Physics
(Director, Bartol Research Foundation, Franklin Institute, Philadelphia)	
CHARLES KENNETH THOMAS, A.B.	Public Speaking
(Instructor in Public Speaking)	
CLARENCE ELLSWORTH TOWNSEND, M.E.	Mechanical Drawing
(Professor of Drawing in the College of Engineering)	
LEONARD CHURCH URQUHART, C.E.	Structural Engineering
(Professor of Structural Engineering)	
OSCAR DIEDERICH VON ENGELN, Ph.D.	Geography and Geology
(Professor of Physical Geography)	
PAUL J. WEAVER	Music
(Director of Music, University of North Carolina)	
HARRY PORTER WELD, Ph.D.	Psychology
(Professor of Psychology)	
LEVI WENCELINS, Licencié ès lettres	French
(Instructor in French, New York University)	
W. G. WHITTAKER, D.Mus.	Music
(Professor of Music, Armstrong College, Newcastle-on-Tyne, England)	
HERBERT AUGUST WICHELNS, Ph.D.	Public Speaking
(Assistant Professor of Public Speaking)	
ARTHUR LENSON WOEHL, M.A.	Public Speaking
(Instructor in Public Speaking)	
CHARLES V. P. YOUNG, A.B.	Physical Education
(Professor of Physical Education and Director of the Gymnasium)	
KARL ABELL ZELLER, Ph.B., A.M.	Physics
(Teacher of Science, High School, Columbus, Ohio)	

OBJECT OF THE SESSION

INSTRUCTION ADAPTED TO VARIOUS NEEDS

The primary object of the Summer Session is to advance education by helping those engaged in it. The instruction is adapted to the needs of the following classes:

1. Professors and teachers in colleges and schools, superintendents, and supervisors of special branches of instruction.

The announcements of the different departments show a wide range of work. This work is either advanced and, therefore, suited to specialists who wish to pursue their individual study; or more elementary and adapted to teachers who desire to start in a new field. In addition to the instruction of the classroom, the University's libraries, museums, laboratories, and shops are open for use.

2. College students in Cornell or other universities who wish to make some scholastic use of the long vacation, especially those whose college studies may for one reason or another have been interrupted. Graduates may count some of the courses toward an advanced degree. See the Announcement of the Graduate School with regard to opportunities for advanced work and research during the summer.

Undergraduates who are in good standing academically may anticipate requirements and thereby shorten their course, or may make up existing deficiencies. The conditions for receiving credit, and the amount which may be obtained, are stated below, under the head of Academic Credit for Work.

3. Students entering the University and wishing to obtain surplus credit at entrance, or to complete the entrance requirements.

It often happens that students have in June more or less than the requirements for admission to college. The Summer Session affords them the opportunity either to add to their surplus and thus, in some cases, to gain a year in time; or to make up their deficiency.

4. All persons qualified to pursue with profit any course given, whether or not they are engaged in formal study or teaching.

ACADEMIC CREDIT FOR WORK

IN THE COLLEGE OF ARTS AND SCIENCES

The academic requirements for the degree of Bachelor of Arts are the completion of one hundred and twenty hours of elective work. Before graduation a student must complete six hours in each of certain specified groups of study, thirty of these hours during the first two years, under certain restrictions (the underclass requirements). During his last two years he must also elect twenty hours in some one department or group of related departments (the upperclass requirements).

To obtain credit toward the Cornell degree by means of work done in Summer Sessions, a student must have previously satisfied the entrance requirements of the College, and must obtain in advance the Dean's approval of his selection of courses. He may then obtain in any Summer Session credit for the number of hours he passes, with a minimum of four or a maximum of eight in each Session. Credit for thirty hours, but no more, may be secured in this way.

The Summer Session records of students registered in the College of Arts and Sciences are reviewed by the usual standing committees of the College, and poor records in the Summer Session are liable to the same penalties as in the regular University session.

The foregoing regulations apply to students matriculated at Cornell. Undergraduates enrolled in other institutions and wishing to have credits earned in the Summer Session applied on their work at such other institutions should, before coming to Ithaca, consult their own college authorities and make all arrangements by them deemed necessary. The Cornell Summer Session can assume no responsibility for the use to be made of credits earned by students thus coming from other places of study. The certificates mentioned on page 11 will show what courses have been taken, the amount of credit in terms of Cornell "hours," and the grades.

IN OTHER COLLEGES OF THE UNIVERSITY

The nature and amount of credit allowed in other colleges at Cornell for work in the Summer Session may be learned from the statements under the announcement of each course.

IN THE GRADUATE SCHOOL

A graduate of any college whose requirements for a first degree are substantially equivalent to those for the first degree at Cornell may be admitted to resident study in the Graduate School. He may at once enter upon candidacy for an advanced degree if he is able to show that he has had adequate preliminary training in the subjects in which he proposes to work. The requirements for the degree do not depend primarily on the completion of any prescribed number of courses or of a fixed term of residence. They are rather based upon actual achievement in scholarship and research in the fields indicated by the major and minor subjects. The writing of a thesis and the passing of a special examination are also required. The minimum period of residence for the Master's degree is one academic year or its equivalent and for the Doctor's degree three years.

Not all work done by a graduate student is graduate work in the strict sense of the term. Graduate work to be considered acceptable for a degree must be of advanced character in some field or department of knowledge. No residence towards a master's degree will be granted any student who does not register with the Dean of the Graduate School within three days after the opening of the Session, and who does not formally become a candidate for this degree under the direction of a special committee. The latest day for such registration in 1928 is July 5.

Students of the University Summer Session, of the Summer School of Biology, and of the New York State Summer Session who have been admitted to candidacy for an advanced degree are required to pay the regular tuition of the session but are exempt from tuition and administration fees in the Graduate School. On registering for the first time as candidates, students who have not previously matricu-

lated in Cornell University will be given matriculation without payment of the usual fee on presenting a certificate that they have paid the tuition charges for the current Summer Session.

Students registered in the Graduate School and excused from tuition in the New York State Summer Session as residents of the state are charged on the first registration in the Graduate School a matriculation fee of \$10, and for each session an administration fee of \$6.25.

When a graduate student has paid during summer sessions, or summer sessions and the academic year combined, an amount equal to the tuition and administration fees required of students who are candidates for the same degree during the regular year, he may on the recommendation of his special committee be absolved from the payment of additional tuition in the Summer Session, but will be required to pay an administration fee of \$6.25 for each subsequent summer session.

The residence requirements for the degree of Master of Arts may be fulfilled in whole or in part by attendance during the Summer Session of the University. For this purpose, two Summer Sessions will be regarded as the equivalent of one term, and four Summer Sessions as the equivalent of one year. Candidates for this degree who are in residence during Summer Sessions only are also required to continue their studies during the year under the direction of the chairman of the special committee in charge of their work.

Any person wishing to become a candidate for an advanced degree and to study during the Summer Session is advised to write to the professor whose work he expects to take, and also to the Dean of the Graduate School, asking for a blank form of application for admission to the Graduate School. It is much better to make these arrangements before coming to Ithaca, thus avoiding delay and interruption of study after the Summer Session has begun. In this way, moreover, it may be possible to secure the advice and guidance of professors in fields of study of which no specific mention is made in the announcements. Not all departments formally offer graduate work. In some departments, notably in the Summer School of Biology, opportunities for research may be had for a longer period than the six weeks during which courses are formally conducted.

In certain departments also an invitation is issued to scholars who are beyond the stage of regular graduate study to make use of the resources of the University in these fields for carrying on research.

CERTIFICATES FOR WORK DONE

Students of the Summer Session who are not matriculated in the University may receive certificates of attendance and of work satisfactorily performed. Application for them must be made before August 10, and the applicant must leave at the office of the Registrar a large-sized envelope stamped and directed to his home address. The certificate will then be forwarded by mail. The regulations of each department for the granting of a certificate must be met.

GENERAL INFORMATION

CONDUCT AND SCHOLARSHIP

The Summer Session is conducted under the same general regulations concerning conduct and scholarship as apply during the academic year. For this reason students are requested to familiarize themselves with dormitory and other rules, and to abide by them. The officers of the University also reserve the right to cancel the registration of any student at any time for neglect of scholastic duties. The rules governing student conduct are:

"A student is expected to show both within and without the University unfailing respect for order, morality, personal honor, and the rights of others. The authority to administer this rule and to impose penalties for its violation is vested in the University Committee on Student Affairs. The rule is construed as applicable at all times, in all places, to all students of the University. A student may at any time be removed from the University if, in the opinion of the Committee on Student Affairs, his presence is not conducive to the University's best interests."

ADMISSION

There are no examinations for admission to the Summer Session. Each person must, however, satisfy the instructor in charge of every course he intends to take, unless it be elementary, that he is qualified to pursue the work.

An undergraduate student who is registered in a college at Cornell or elsewhere and who wishes to enter the Summer Session should secure from his dean or other competent authority a certificate of good standing. A blank form of such certificate may be had on application to the Secretary of the Summer Session.

Undergraduate students whose names have been removed from the rolls of any college are not admitted to the Summer Session except upon the recommendation of the college concerned.

There are some special requirements to be met by applicants for admission to the summer session of the Law School, and such persons should consult the separate announcement of that session.

Admission to the classrooms during the Summer Session is restricted to students duly registered for the session. A student thus duly registered may occasionally visit any class; but if he wishes to attend regularly without credit he must secure special permission from the Chairman of the Summer Session. Such permission will be granted only when the student can show a serious purpose in such attendance.

If a student entering the Summer Session wishes his work to count toward a degree, there are certain regulations that he must comply with, and he will find them set forth under the head of Academic Credit for Work, page 9.

REGISTRATION

All students of the Summer Session are required to register with the Registrar of the University. The hours and places of registration are given in the Calendar of the session, on page 3. Students may register on Saturday, June 30, between 8 A. M. and 5 P. M., on the day of their arrival, if they reach Ithaca on July 2 or later. They are urged to register on June 30. Registration before that day is not required, and it is not necessary to apply in advance for registration blanks.

Beginning on Monday, July 2, the Registrar's office in Morrill Hall will be open from 9 A. M. till 4 P. M. every week day except Saturday, when it will be closed at noon.

Students who wish to obtain credit for graduate work to be done during the Summer Session must register not only with the Registrar but also with the Dean of the Graduate School, at his office in Room 22, Morrill Hall.

Persons who are to take courses in the New York State Summer Session and in any department of the Summer Session of the University must register for both the Summer Session and the New York State Summer Session. They are required to pay only one tuition fee.

TUITION

The charge for tuition in the Summer Session of the University is fifty dollars. In the summer session of the Law School it is eighty-five dollars for the whole session of eleven weeks, or forty-five dollars for either term of five and one-half weeks.

The tuition fee is payable in full, on the first registration day or within the next five days, at the office of the Treasurer, Room 1, Morrill Hall.

Any student who fails to pay his tuition charges, other fees, and other indebtedness to the University, or who, if entitled to free tuition, fails to claim it at the Treasurer's office and to pay his fees and other indebtedness, within the prescribed period of grace, is thereby dropped from the University unless the Treasurer has granted him an extension of time to complete payment. The Treasurer is permitted to grant such an extension when, in his judgment, the circumstances of a particular case warrant his doing so. For any such extension the student is assessed a fee of \$5 for the first week and \$2 additional for each subsequent week in which the whole or any part of the debt remains unpaid, but the assessment in any case is not more than \$15. The assessment may be waived in any instance for reasons satisfactory to the Comptroller and the Registrar, when such reasons are set forth in a written statement.

If a student withdraws from the Summer Session, the Treasurer may refund a part of the tuition fee or cancel a part of the obligation that the student has incurred for tuition, provided the reason for the withdrawal be stated in writing and be satisfactory to the Comptroller and the Registrar. In such a case the student is required to pay twenty-five per cent of the term's tuition for each week or fraction of a week between the first registration day and the date of his certificate of withdrawal.

Students registering at any time during the last four weeks of the Summer Session or of either term of the summer session of the Law School are required to pay for the remainder of the term at the rate of twenty-five per cent of the

term's tuition for each week or fraction of a week between the date of registration and the last examination day of the term.

Any tuition fee or other fee may be changed by the Trustees to take effect at any time without previous notice.

IN THE NEW YORK STATE SUMMER SESSION

Tuition in any of the courses of the Summer School of Agriculture and of the Summer School of Home Economics is free to admitted students who are residents of the State of New York and who have been residents for at least one year immediately preceding registration. *An incidental fee of ten dollars* is, however, charged to all students for admission. Students from outside the State of New York, whether they take one subject or more, are required to pay fifty dollars, in which is included the incidental fee.

Free tuition does not include instruction in the Summer School of Biology or any instruction outside the College of Agriculture and the College of Home Economics, nor are students receiving free tuition permitted to attend classes outside the College of Agriculture and the College of Home Economics.

OTHER FEES

In *Chemistry* a laboratory fee is charged for material actually consumed. A deposit of such amount as the instructor may prescribe must be made with the Treasurer.

Physics. For laboratory fees in physics see descriptions of courses.

In *Geography and Geology*, in Course S 8 and in Course S 9 a fee of one dollar must be paid in advance to the Treasurer to cover incidental expenses of the course.

In *Drawing and Painting*, Course S 7, a fee of ten dollars is required.

In *Public Speaking*, Course S 31 a special laboratory fee of five dollars is required.

Biology. A laboratory fee is charged for each course in Biology, varying with the character of the course. The amount which the student must expect to pay upon beginning any course is stated in the description of that course, under the head of Summer School of Biology, page 51.

Swimming. A special charge of ten dollars is made for the instruction in Swimming.

Tennis. A special charge of ten dollars is made for instruction in Tennis.

Shop-Work. Students not matriculated in the College of Engineering of Cornell University are required to pay a fee of \$3.50 for each credit hour of shop-work for which they register.

Library. A person who obtains the privilege of taking books from the University Library for home use is required to make a deposit of five dollars, which will be refunded upon the return of all books taken out.

Willard Straight Hall. A fee of two dollars is charged for the privileges of Willard Straight Hall. See page 18.

RESIDENTIAL HALLS: ROOMS: BOARD

FOR WOMEN

The University has three residential halls for women in which rooms and board may be obtained during the Summer Session by registered students only. They are:

Sage College, which accommodates 175 persons. Here the charge for room, table board, and a specified amount of laundry, for the session, is from \$75 to \$90, according to the size and location of the room.

Prudence Risley Hall, which accommodates 184 persons. Here the charge for room, table board, and a specified amount of laundry, for the session, is from \$81 to \$90, according to the size and location of the room.

Cascadilla Hall. In this building, which accommodates about 160 persons, a furnished room may be had for the session at a cost of \$23 to \$29. The charge includes a specified amount of laundry. This building has shower baths and not tubs. On the ground floor the University conducts a cafeteria restaurant where meals can be obtained at reasonable rates.

Besides these halls, there are certain *approved houses* which are occupied exclusively by women and which, like the halls, are under the direct supervision of the Dean of Women.

Undergraduate women students of Cornell and other colleges and other women students under twenty-one years of age are expected to live in the residential halls or the approved houses. Any woman student should consult the Dean of Women before engaging a room.

In Sage College and Prudence Risley Hall, the charge for room and board includes lodging Saturday night, June 30 (not earlier), breakfast Sunday, July 1, and all meals to and including breakfast Saturday, August 11.

Members of the Summer Session who lodge outside Sage College and Prudence Risley Hall may obtain table board at either of those halls for \$9 a week.

Each of the residential halls is in charge of a warden, who is glad to know the students, to advise them in illness or other emergency, and to give them whatever information they wish about the University or the town. It is understood that persons living in the halls will conform to the house regulations made for the convenience and comfort of all.

Application for rooms in any of the residential halls or approved houses for women should be made to the Manager of Residential Halls, Morrill Hall, Ithaca, N. Y. Information about such rooms may be obtained from the Manager in advance of the application. The list of approved houses will be available after June 1 on application to the Manager, and also, if desired, a supplementary list of private houses with desirable rooms available for mature women who prefer

to live outside any of the halls or approved houses. Checks should be drawn to the order of Cornell University.

A deposit of five dollars must accompany each application for a room in any of the three residential halls; otherwise the application will not be entertained. The rooms are reserved in the order of application. If a room assigned is occupied by the applicant, the amount of the deposit is held until the end of the session to cover the return of keys and any damage to building or furniture other than ordinary wear and tear, and to insure the completion of the lease. The deposit will be refunded if the applicant gives formal notice to the Manager on or before June 15 that she wishes to withdraw her application.

FOR MEN

Men attending the Summer Session can obtain comfortable and attractive rooms in the new Residential Halls for Men, which are west of the main quadrangle, conveniently near to the other University buildings. These halls are thoroughly modern and of fireproof construction.

Application for rooms in the Residential Halls for Men, or for plans of the rooms or other information about them, should be made to the Manager of Residential Halls, Morrill Hall, Ithaca, N. Y. Checks should be drawn to the order of Cornell University.

The charge for furnished room, including care of the room and laundry of bed linen, is \$21 for the session. There are a few suites at a higher rate, and some rooms on the top floor may be had for less.

Board may be obtained for an average of \$1 to \$1.50 a day in Willard Straight Hall near the residential halls, or in other dining rooms or restaurants on or near the campus.

A list of private houses offering desirable rooms for rent for the session can be obtained after June 1 by application to the Manager of Residential Halls, Morrill Hall, Ithaca, N. Y.

THE COST OF LIVING

An estimate of the cost of living in Ithaca in the summer can be made by consulting the figures given above. In a private house a student may be able to rent a room at a little less cost for the session than in one of the residential halls. Rooms are rented with the understanding that they will be occupied for the entire session unless both parties agree otherwise. Table board is generally engaged by the week.

MEANS OF SELF-SUPPORT

Students, either men or women, who wish to earn a part of their expenses during the session are invited to correspond in advance with the Manager of Residential Halls, Morrill Hall, Ithaca.

THE STUDENT'S HEALTH

MEDICAL ADVICE

The University's staff includes a medical adviser of men and a medical adviser of women, and each of them has a corps of assistants. The medical advisers observe regular office hours, from 10 A. M. till 12 M. daily, at their respective offices in the Gymnasium for men and in Sage College for women. No charge is made for their services.

In cases of illness or indisposition which involve absence from classes even for one day, students are expected to report immediately either in person, by telephone, or by messenger to the medical adviser's office. For the convenience of the adviser such illness should be reported early in the day. Students indisposed but still able to attend classes should consult the medical adviser immediately in order that advice may be given and that diagnosis of incipient diseases may be made promptly. Any student failing to report as soon as possible to the medical adviser any contagious or infectious disease will be regarded as guilty of a serious breach of discipline.

A medical examination is not required of students in the Summer Session, but such an examination may be had without charge upon special request as long as the facilities of the office are not overtaxed.

A student may at any time be requested to withdraw from the University if, in the opinion of the University authorities, the condition of his health is such as to make it unwise for him to remain.

Every student matriculating in Cornell University must present a certificate showing that he has been vaccinated within five years. Students in the Summer Session are not matriculated students and of them accordingly such vaccination certificate is not required. If, however, students attending the Summer Session should matriculate in any of the colleges of the University or in the Graduate School, they must give evidence of recent vaccination like others so matriculated.

THE UNIVERSITY INFIRMARY

The University Infirmary occupies three large buildings near the campus. The first of these, a brownstone structure, was the home of Henry Williams Sage, for many years chairman of the Board of Trustees of the University. After his death in 1897, his sons, Dean and William Henry Sage, endowed it and gave it to the University for a student's infirmary as a memorial of their father. The second building, the Schuyler House, was purchased in 1911; in 1912 the Trustees erected a third building, fireproof, and this is the present main hospital building. The normal capacity of the Infirmary is seventy-five beds; the number can be doubled in an emergency.

The Infirmary, which is in charge of an experienced superintendent and is thoroughly equipped, provides suitable rooms, food, and nursing for sick students. It has no medical staff; students find their own physicians among practitioners in Ithaca or elsewhere.

Students in the Summer Session have all the privileges of admission to the Infirmary. They pay no fee in advance, but are liable to regular charges for services rendered.

THE LIBRARIES

The University Library is open on week days from 8 A. M. till 10:30 P. M. In this building are the main library, containing about 500,000 volumes, and most of the seminary and special libraries. The main reading room affords accommodations for more than two hundred readers, and contains a selected library of about 8,000 volumes of reference works. Below stairs is the periodical room in which are kept the current numbers of about 500 journals in various fields of knowledge. These rooms are open to all students. Students properly qualified are allowed the use of the seminary rooms and the books in them. The main collection is primarily a library of reference for use in the building. Students are, however, to a limited extent, allowed to take out books for home use. Persons wishing this privilege must make a deposit of \$5, which will be refunded upon the return of all books taken out.

The reference library in Goldwin Smith Hall is open for the use of summer students from 9 A. M. till 5 P. M. on week days throughout the session.

The library of the Law School numbers more than 56,000 volumes and about 5,800 pamphlets, to which generous additions are made yearly. It includes the library of the late Nathaniel C. Moak of Albany, N. Y., which was presented in 1893 by Mrs. A. M. Boardman and Mrs. Ellen D. Williams, as a memorial to Judge Douglas Boardman, the first dean of the School. In reports of the federal courts, and of the several American state jurisdictions, and in English, Scotch, Irish, Canadian, Australian, and English colonial reports, the law library is practically complete to date.

The Library of the College of Agriculture, in the basement of Stone Hall, is open on week days from 9 A. M. till 5 P. M., except Saturday, when it is closed at 1 P. M. In it will be found a large collection of bulletins and reports of experiment stations, reference books on agriculture and country life, agricultural periodicals, and the like. The entomological library, in the department of entomology on the fourth floor of Roberts Hall, is one of the most complete of its kind in the United States. Nearly all of the departments in which instruction is given have well-selected departmental libraries.

WILLARD STRAIGHT HALL

All privileges of Willard Straight Hall, the social center of the University, are open to Summer Session students, both men and women, as during the regular college year. In accordance with the regular procedure, a fee of \$2 is required of all summer registrants, payable at the time of the regular tuition fee.

SAGE CHAPEL

Religious services are conducted in Sage Chapel throughout the academic year by clergymen of various religious denominations.

There will be services in the Chapel on five Sundays during the Summer Session, July 8 to August 5 inclusive.

LECTURES: MUSICAL RECITALS: EXCURSIONS

In addition to the regular classroom work there will be general public lectures on Monday evenings, and also lectures of general interest each week in connection with the work of various departments. They will be all announced in the Weekly Calendar.

Organ recitals will be given on Tuesday evenings in Sage Chapel and on Sunday evenings in Bailey Hall. A piano lecture-recital will be given each week. These entertainments are free to all students.

Two concerts by distinguished artists will be given in the course of the session; see the Calendar on page 3. Students can buy tickets for these concerts at reduced rates.

Wednesday evenings are devoted to the departmental conferences, which are open to all interested persons. Notice of these conferences will be given from week to week.

Excursions, in connection with the work of certain departments, are made to many points of interest. Some of them are open to all members of the Summer Session. Especially noteworthy are the excursions to Watkins Glen and to Niagara Falls.

RAILROAD ROUTES TO ITHACA

Ithaca can be reached from New York City by either the Delaware, Lackawanna & Western or the Lehigh Valley Railroad. On both roads there are good trains, with Pullman cars, both night and day. Passengers from the west reach Ithaca by way of the Lehigh Valley Railroad from Buffalo. From stations on the Boston & Albany Railroad, the shortest route to Ithaca is by way of Syracuse and Auburn. From Philadelphia, and from Baltimore, Washington, and the south by way of the Baltimore & Ohio, the Philadelphia & Reading connects with the Lehigh Valley at Bethlehem. From stations on the Erie, connection with Ithaca can be made either by the Lackawanna at Owego or by the Lehigh Valley (Elmira and Cortland branch) at Elmira. Ithaca has connections with the New York Central at Geneva, Auburn, and Canastota.

COURSES OF INSTRUCTION

In this list the names of the departments of instruction are in alphabetical order. There is an index on page 81.

Most of the courses consist of five exercises a week, or one hour each week day except Saturday. The number of actual hours of class work in any course can be found by multiplying the number of weekly exercises by six.

The word *hour* used with reference to University credit means the equivalent of one class exercise a week for a half-year or one semester. One hundred and twenty such hours are required of candidates for the A.B. degree.

GS signifies *Goldwin Smith Hall*.

ASTRONOMY

S 1. General Astronomy. Credit two or three hours. Lectures and recitations, daily, 8. *Lincoln* 39. Laboratory and observations, T or Th, 8-10 P. M. *Observatory*. Professor BOOTHROYD.

A general introductory course intended especially for teachers who may wish to prepare more thoroughly for teaching general science or geography. The lectures are illustrated by models and by lantern slides and the 12-inch equatorial and other instruments of the Observatory are used for observation and instruction. Tancock's *Elements of Descriptive Astronomy* and Fath's *Elements of Astronomy* are used for reference.

CHEMISTRY

The courses announced below correspond entirely or in part with courses given during the regular sessions of the University. For regular students the requirements for admission to the various courses will be the same as during the year.

Teachers may be admitted to any course for which their general training or experience may be considered to prepare them. Every effort will be made to meet the individual needs of teachers by arranging and modifying the work as far as possible so as to fulfill the particular requirements in each case.

All courses in Chemistry are given in the *Baker Laboratory of Chemistry*.

S 101. Introductory Inorganic Chemistry. Credit three hours. Lectures, daily except Sat., 12. *Main Lecture Room*. Professor BROWNE and Mr. BRITT. The lectures deal with the fundamental theories and laws of chemistry, and with the more common elements and their compounds. They are profusely illustrated by experiments. The course is primarily designed to meet the needs of teachers in secondary schools, and to that end emphasis is laid upon methods of lecture presentation and experimental demonstration. Students other than teachers must, before registering, satisfy the department that they are properly prepared to carry on the work.

S 105. Introductory Inorganic Chemistry. Recitations and laboratory practice. Credit three hours.

Laboratory, M W, 8-12, and T Th F, 9-12. *Room* 150. Assistant Professor MCKINNEY and Mr. ROBEY. A series of experiments designed to illustrate the fundamental laws of chemistry and to acquaint the student with the properties of the principal elements and their compounds. For the benefit of teachers who may take the course special attention will be given to the methods of laboratory instruction, quantitative experiments, and the blowing of simple glass apparatus.

Recitations, T Th F, 8. *Room* 22. Assistant Professor MCKINNEY. The recitations deal with the subject matter of the lectures and with the experimental work in the laboratory and afford thorough drill in the solution of chemical problems.

S 205. Introductory Qualitative Analysis. Credit three hours. Must be taken with Course S 206. Lectures and recitations, daily except S, 8, T₂Th, 11. *Room 107.* Assistant Professor NICHOLS.

A study of the application of the theories of general chemistry to the systematic separation and detection of the common elements and acid radicals.

S 206. Introductory Qualitative Analysis. Credit three hours. Must be taken with Course S 205. Laboratory, daily except S, 2-4:30, and M W, 9-12. *Room 50.* Assistant Professor NICHOLS and Mr. MURRAY.

A study of the properties and reactions of the common elements and acid radicals; the qualitative analysis of a number of solutions and solid compounds.

S 210. Introductory Qualitative Analysis. Shorter course. Lectures and laboratory practice. Credit three hours. Lectures, M W F, 11. *Room 107.* Assistant Professor NICHOLS. Laboratory, daily except S, 2-4:30. *Room 50.* Assistant Professor NICHOLS and Mr. MURRAY.

The properties and reactions of the common elements and acids, and their detection in various liquid and solid mixtures.

S 220. Introductory Quantitative Analysis. Credit three hours. Must be taken with Course S 221. Lectures and recitations, daily except S, 8. *Room 202.* Mr. HOSKING.

A study of the fundamental principles of gravimetric and volumetric analysis with practice in stoichiometry.

S 221. Introductory Quantitative Analysis. Credit three hours. Must be taken with Course S 220. Laboratory, daily except S, 9-1. *Room 294.* Mr. HOSKING and Mr. DRESSER.

The preparation and standardization of various volumetric solutions and the analysis of a variety of substances by volumetric and gravimetric methods.

S 225. Introductory Quantitative Analysis. Shorter course. Lectures and laboratory practice. Credit three hours. Lectures, T Th, 11. *Room 207.* Assistant Professor NICHOLS. Laboratory, daily except S, 8-11. *Room 294.* Mr. HOSKING and Mr. DRESSER.

The preparation and use of volumetric solutions and work in elementary gravimetric analysis.

S 230. Advanced Quantitative Analysis. Recitations and laboratory practice. Credit two to four hours. Laboratory, daily except S, 8-1. *Room 294.* Mr. HOSKING and Mr. DRESSER.

Gravimetric, volumetric, and electrolytic methods of analysis, and methods of combustion analysis; the calibration of weights and volumetric apparatus, analysis of iron and steel, alloys, silicates, etc.

S 305. Introductory Organic Chemistry.

A. First term. Credit three hours. Lectures and written reviews. Daily, 8. *Room 207.* Assistant Professor JOHNSON.

B. Second term. Credit three hours. Lectures and written reviews. Daily, 9. *Room 302.* Open to those who have had or who are taking S 305 A. Mr. PHELAN.

The lectures discuss systematically the more important compounds of carbon, their occurrence, methods of preparation, reactions, relations, and uses.

S 310. Introductory Organic Chemistry.

A. First term. Credit one to three hours. Laboratory practice and oral reviews. Open to those who have had or who are taking S 305 A. Hours to be arranged, in the mornings. Mr. PHELAN and Mr. ———.

B. Second term. Credit one to three hours. Laboratory practice and oral reviews. Open to those who have had S 305 A and S 310 A. Hours to be arranged, in the mornings. Mr. PHELAN and Mr. ———.

The student prepares a number of typical compounds and familiarizes himself with their properties, reactions, and relations.

It is recommended that S 305 A and S 310 A be taken in one summer, and that S 305 B and S 310 B be taken in the following summer. In exceptional cases S 305 A, S 310 A, and S 305 B, but not S 310 B may be taken together, by special permission.

S 320. Advanced Organic Chemistry. Credit two or more hours. Laboratory practice at hours to be arranged, in the mornings. Assistant Professor JOHNSON. An advanced course in the preparation of organic compounds, involving the use of the more difficult classical methods and of the less common reagents.

S 375. Introductory Organic Chemistry. Shorter Course. Lectures and written reviews. Daily, 8. Room 207, throughout the session, and also daily, 9, during the latter part of the session only. Assistant Professor JOHNSON.

A shorter course in organic chemistry, designed for students in home-economics, pre-medical, biological, and agricultural curricula. Required of students in certain of these curricula. Credit four hours for lectures and written reviews.

Laboratory practice. Credit one or two hours. Hours to be arranged, in the mornings. Mr. PHELAN and Mr. ———.

Students preparing for the study of medicine are required to take two hours of laboratory practice in addition to the four hours of lectures and written reviews.

S 405. Introductory Physical Chemistry.

A. Credit three hours. Lectures, daily except S, 8, and two other lectures at hours to be arranged. Room 7. Professor BRIGGS. A systematic presentation of modern chemical theory. The subject matter includes: gases, liquids, and solids; the theory of solution; colloid chemistry and adsorption; reaction velocity, catalysis, and equilibrium in homogeneous systems.

B. Credit three hours. Lectures, daily except S, 9, and two other lectures at hours to be arranged. Room 7. Professor BRIGGS and Mr. ———. A continuation of Part A. The subject-matter includes the phase rule and its applications; thermochemistry; electrochemistry; photochemistry; application of the principles of physical chemistry to actual practice.

S 410. Physical Chemistry Laboratory. A. Credit three hours. Laboratory practice, daily except S, 8-1. Room 1. Professor BRIGGS and Mr. ———. Open only to those who have taken or are taking Course S 405A or its equivalent. With the data obtained in the laboratory as a basis, detailed reports are written covering each of the following topics: molecular weight determination by vapor density, boiling point and freezing point methods; vapor pressure; viscosity; distillation of liquid mixtures.

B. Credit three hours. Laboratory practice, daily except S, 8-1. Room 1. Professor BRIGGS and Mr. ———. Open only to those who have taken or are taking Course S 405B or its equivalent. The course is a continuation of Part A. The following topics are considered: dissociation; solubility; reactions; reaction velocity and catalysis; indicators; thermochemistry; diffusion; colloids and adsorption; photochemical reactions; phase rule studies of inversion points; solid-liquid, liquid-liquid, compounds.

S 465. Laboratory Practice in Physical Chemistry. Credit one to three hours. Laboratory periods to be arranged. Professor BRIGGS and Mr. ———.

This course is designed to afford opportunity for special laboratory practice in physical chemistry, colloid chemistry, or electrochemistry.

S 530. Introductory Chemical Microscopy. Lectures and laboratory practice. Credit three hours. Lectures, M W F, 10. Room 377. Laboratory, M W F, 11-1, T Th, 10-1; optional, M W, 2-4:30. Room 378. Assistant Professor MASON and Mr. SAYLOR.

The use of the microscope and its accessories; microscopic methods as applied to chemical investigations; micrometry; the examination of crystalline compounds; recognition of textile and paper fibers, etc. The application of microscopic methods to quantitative analysis.

S 535. Advanced Chemical Microscopy. Laboratory practice. Credit three hours. Prerequisite course S 530. Laboratory periods and conference hours to be arranged. Room 378. Assistant Professor MASON and Mr. SAYLOR.

Practice in the examination and analysis of inorganic substances containing the more common elements, with special reference to rapid qualitative methods and to the analysis of minute amounts of material.

Students not desiring University credit, who wish to secure a working knowledge of Chemical Microscopy in the shortest possible time, may arrange with the

instructor to cover the parts of both of the above courses which best meet their needs.

S 195, S 295, S 395, S 495, S 595. **Research.** Credit one to six hours. Senior chemists, and others by special permission, may elect research in the fields of Inorganic, Analytical, Organic, or Physical Chemistry, or Chemical Microscopy, under the direction of some member of the staff of instruction.

S 180. **Teachers' Course in Chemistry.** Daily except S, 10. *Room 22.* Credit two hours. Assistant Professor MCKINNEY.

Lectures, discussions, and conferences concerning the teaching of chemistry in the secondary schools.

DRAWING AND PAINTING

S 1. **Elementary Drawing.** Credit two hours. Daily except Sat., 2-4. *Franklin.* Mr. STARK.

This course for beginners in drawing embraces freehand perspective, drawing of geometrical objects and simple casts. The course will begin with pencil work and continue with light and shade in charcoal.

S 2. **Elementary Color.** Credit two hours. Daily except Sat., 8-10. *Franklin.* Assistant Professor STONE.

Instruction for beginners in color. Students work in pastel from simple groups of objects. Talks will be given on the theory of color.

S 3. **Modeling.** Credit two hours. Daily except Sat., 8-10. *Franklin.* Mr. STARK.

Although this is intended as a course for beginners, advanced students will be given instruction in accordance with their ability.

S 4. **Antique.** Credit two hours. Daily except Sat., 2-4. *Franklin.* Mr. STARK.

Prerequisite for this course is a knowledge of the elements of drawing. Instruction will be given in charcoal from casts.

S 5. **Advanced Color.** Credit two hours. Daily except Sat., 8-10. *Franklin.* Assistant Professor STONE.

As in elements of color, students in advanced color work from groups (vases, fruit, flowers) in oil or in water color. Those who have not had elements of color may enter this course on submission of examples of original work. Copies of others' work will not be sufficient for entrance.

S 6. **Outdoor Sketching in Color.** Credit two hours. Daily except Sat., 2-4. *Franklin.* Assistant Professor STONE.

A knowledge of the elements of drawing and the elements of color is a prerequisite to this course. Instruction is given in water color or oil from landscape.

The unusual variety and charm of the natural environment of Cornell give an abundance of subject-matter from which to work. There are woodland, open farming country, lakes and streams, broad panoramic views, and rugged gorges within easy walking distance of the campus. The student is therefore inspired by surroundings of unique beauty.

S 7. **Drawing from the Human Figure.** Daily except Sat., 10-12. *Franklin.* Assistant Professor STONE and Mr. STARK.

Study from living model in charcoal. Courses S 1 and S 4 or their equivalent are prerequisite to this course. A studio fee of ten dollars is charged.

NOTE. Students are urged to bring portable easels and stools for outdoor work. All materials needed in any of these courses may be obtained in Ithaca.

S 8. **The Appreciation of Art.** Credit two hours. M W, 8:15-9:30 P. M. *Franklin.* Assistant Professor STONE.

An introduction to the study of painting with a general outline of the periods of art.

ECONOMICS

The following courses are designed to meet the needs of three classes of students in the Summer Session: (1) those desiring regular college credit for general economics; (2) students with special interests in economic subjects; (3) students seek-

S 320. Advanced Organic Chemistry. Credit two or more hours. Laboratory practice at hours to be arranged, in the mornings. Assistant Professor JOHNSON. An advanced course in the preparation of organic compounds, involving the use of the more difficult classical methods and of the less common reagents.

S 375. Introductory Organic Chemistry. Shorter Course. Lectures and written reviews. Daily, 8. Room 207, throughout the session, and also daily, 9, during the latter part of the session only. Assistant Professor JOHNSON.

A shorter course in organic chemistry, designed for students in home-economics, pre-medical, biological, and agricultural curricula. Required of students in certain of these curricula. Credit four hours for lectures and written reviews.

Laboratory practice. Credit one or two hours. Hours to be arranged, in the mornings. Mr. PHELAN and Mr. ———.

Students preparing for the study of medicine are required to take two hours of laboratory practice in addition to the four hours of lectures and written reviews.

S 405. Introductory Physical Chemistry.

A. Credit three hours. Lectures, daily except S, 8, and two other lectures at hours to be arranged. Room 7. Professor BRIGGS. A systematic presentation of modern chemical theory. The subject matter includes: gases, liquids, and solids; the theory of solution; colloid chemistry and adsorption; reaction velocity, catalysis, and equilibrium in homogeneous systems.

B. Credit three hours. Lectures, daily except S, 9, and two other lectures at hours to be arranged. Room 7. Professor BRIGGS and Mr. ———. A continuation of Part A. The subject-matter includes the phase rule and its applications; thermochemistry; electrochemistry; photochemistry; application of the principles of physical chemistry to actual practice.

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Practice in the examination and analysis of inorganic substances containing the more common elements, with special reference to rapid qualitative methods and to the analysis of minute amounts of material.

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instructor to cover the parts of both of the above courses which best meet their needs.

S 195, S 295, S 395, S 495, S 595. **Research.** Credit one to six hours. Senior chemists, and others by special permission, may elect research in the fields of Inorganic, Analytical, Organic, or Physical Chemistry, or Chemical Microscopy, under the direction of some member of the staff of instruction.

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S 2. **Elementary Color.** Credit two hours. Daily except Sat., 8-10. *Franklin.* Assistant Professor STONE.

Instruction for beginners in color. Students work in pastel from simple groups of objects. Talks will be given on the theory of color.

S 3. **Modeling.** Credit two hours. Daily except Sat., 8-10. *Franklin.* Mr. STARK.

Although this is intended as a course for beginners, advanced students will be given instruction in accordance with their ability.

S 4. **Antique.** Credit two hours. Daily except Sat., 2-4. *Franklin.* Mr. STARK.

Prerequisite for this course is a knowledge of the elements of drawing. Instruction will be given in charcoal from casts.

S 5. **Advanced Color.** Credit two hours. Daily except Sat., 8-10. *Franklin.* Assistant Professor STONE.

As in elements of color, students in advanced color work from groups (vases, fruit, flowers) in oil or in water color. Those who have not had elements of color may enter this course on submission of examples of original work. Copies of others' work will not be sufficient for entrance.

S 6. **Outdoor Sketching in Color.** Credit two hours. Daily except Sat., 2-4. *Franklin.* Assistant Professor STONE.

A knowledge of the elements of drawing and the elements of color is a prerequisite to this course. Instruction is given in water color or oil from landscape.

The unusual variety and charm of the natural environment of Cornell give an abundance of subject-matter from which to work. There are woodland, open farming country, lakes and streams, broad panoramic views, and rugged gorges within easy walking distance of the campus. The student is therefore inspired by surroundings of unique beauty.

S 7. **Drawing from the Human Figure.** Daily except Sat., 10-12. *Franklin.* Assistant Professor STONE and Mr. STARK.

Study from living model in charcoal. Courses S 1 and S 4 or their equivalent are prerequisite to this course. A studio fee of ten dollars is charged.

NOTE. Students are urged to bring portable easels and stools for outdoor work. All materials needed in any of these courses may be obtained in Ithaca.

S 8. **The Appreciation of Art.** Credit two hours. M W, 8:15-9:30 P. M. *Franklin.* Assistant Professor STONE.

An introduction to the study of painting with a general outline of the periods of art.

ECONOMICS

The following courses are designed to meet the needs of three classes of students in the Summer Session: (1) those desiring regular college credit for general economics; (2) students with special interests in economic subjects; (3) students seek-

ing broad preparation for the teaching of economics in the secondary schools. For the first group, Course S 1 covers the subject matter usually included under elementary economics. For Cornell students Course S 1 satisfies the economics requirement in the College of Engineering and will also serve in lieu of Course 1 as a prerequisite for admission to various advanced courses in economics. Graduate students wishing to pursue special investigations will be afforded assistance by other members of the Department of Economics of the University who may be in residence in Ithaca during the summer.

S 1. Modern Economic Society. Credit four hours. Twice daily except Sat., 11 and 12. GS 142. Messrs. JUNKIN, McNATT, and PENDELL.

A survey of the existing economic order, its more salient and basic characteristics, and its operation.

S 5. Current Economic Problems. Credit two hours. Daily except Sat., 8. GS 264. Assistant Professor HOMAN.

A continuation of Course 1, designed to afford students an opportunity to become acquainted in a general way with the more important economic problems of the day: tariff problem, reparations problem, railroad problem, trust problem, labor problem, problems of the farmer, conservation problem, and problems of taxation and public finance.

S 12. Financial History of the United States. Credit two hours. Daily except Sat., 10. GS 264. Professor REED.

The period surveyed will be that following the Civil War. The emphasis will be upon the economic implications rather than the narration of the major fiscal activities of the United States Government.

S 13. Corporation and Investment Finance. Credit two hours. Daily except Sat., 9. GS 264. Professor REED.

A study of the financial problems of the business corporation from the points of view of the management and of the investor.

S 33. The Rise of Modern Capitalism. Credit two hours. Daily except Sat., 9. GS 124. Assistant Professor HOMAN.

A study of changing economic institutions from the fifteenth to the nineteenth centuries, including the breakup of medieval organization, the commercial revolution, the rise of capitalistic control in industry and commerce, the industrial revolution and accompanying changes in social organization and problems.

S 50. Introduction to Sociology. Credit two hours. Daily except Sat., 10. GS 142. Dr. REDFIELD.

Analysis of the structure and organization of society and of social processes, relations, and groups, with application to problems of modern society.

S 53. Social Evolution. Credit two hours. Daily except Sat., 11. GS 124. Dr. REDFIELD.

Antiquity of man, organization of primitive society, origin and development of social institutions.

EDUCATION

Courses S 1, S 2, S 3, and S 4, will be found especially helpful to college graduates who are preparing for examinations in professional subjects as outlined in the New York State Syllabus and Course of Study for the renewal of the College Graduate Certificate Limited. The State Department of Education will hold an official examination for such candidates at Ithaca on August 13 and 14.

Under certain conditions teachers may waive the state examination by completing an approved course of study in the Summer Session. Information regarding details of such a course may be had by consulting Professor R. H. JORDAN, Goldwin Smith Hall 252, either in person or by letter.

S 1. Educational Psychology. Credit two hours. Daily except Sat., 11. GS 256. Dr. FREEMAN.

A study of the learning process and its application to educational theory and practice; the original nature of man; reflex action and instinct; the acquisition of habits; attention, memory, association, and thinking; fatigue, individual differences, and social co-operation.

S 2. Principles of Education. Credit two hours. Daily except Sat., 9. GS 256. Professor RUEDIGER.

A study of education from the sociological standpoint: infancy, heredity, and eugenics; the problem of aim; formal discipline; social and personal objectives; the curriculum; the studies and their functions. Texts: Ruediger, *Principles of Education*; Peters, *Foundations of Educational Sociology*.

S 3. History of Education. Credit two hours. Lectures, recitations, and prescribed readings. Daily except Sat., 12. GS 256. Dr. BRUCE.

The purpose of this course is to give an understanding of present educational values and practices through an historical consideration of their origin and development.

The topics treated are to a great extent those emphasized in the syllabus for the New York State Teachers' Certificate; education in primitive and barbaric societies; the rise of the school as an institution; Greek and Roman education; scholasticism, humanism, and realism; the 'psychological' movement; the origin and nature of specifically modern tendencies in education.

S 4. Secondary School Methods. Credit two hours. Daily except Sat., 10. GS 256. Professor RUEDIGER.

A study of the principles underlying vital instruction in its intellectual, emotional, and motor phases: the use of supplementary devices; the project; motivation; types of subject matter; lesson assignment; questioning; the art of study; supervised study; tests and examinations; lesson planning; class management.

The course is planned to meet the New York State Certificate requirement in general method, and is adapted especially to the needs of younger and relatively less experienced teachers. Texts: Parker, *Methods of Teaching in High School*; Ruediger, *Vitalized Teaching*.

S 5. High School Administration. Credit two hours. Daily except Sat., 8. GS 256. Professor JORDAN.

A study of the principles basic to administration of the senior and junior high school; the course of study; principles of election; classification of pupils; use of intelligence and achievement tests; the principal as supervisor; building problems; selection and rating of teachers; schedule-making; problems growing out of the experience of the class.

S 7. Mental Measurements. Credit three hours. Lectures, prescribed readings, and laboratory. Daily except Sat., 9. GS 242. Laboratory, hours to be determined. GS 248. Dr. FREEMAN.

The first half of this course furnishes a general introduction to the psychology and practice of mental tests. The lectures deal with the historical development of tests; the principles underlying their formation and application; the single tests and the test systems; a detailed study of the principles and use of the Stanford Revision of the Binet-Simon Scale; a brief consideration of the measures of central tendency, variability, and correlation; the bearing of tests upon the problems of psychological theory (nature and distribution of intelligence, the correlation of abilities, etc.). The laboratory work is intended to give practice in administering tests, both to individuals and to groups.

The second half of the course will consider the use of the tests in schools for the diagnosis of defective and exceptional abilities; the causes, frequency, and consequences of mental deficiency; the social and educational treatment of defective, delinquent, retarded, superior, and psychopathic children.

S 9. Special Problems in Education. Hours and credit to be arranged. Professor JORDAN will advise students majoring in the Department of Education; students majoring in rural education may consult any member of that Department.

This course is designed to give advanced students an opportunity for study of special problems. The work may consist either of essays and reports on some special topic, or of laboratory practice of an advanced grade. A seminary will be held if application is made by a sufficient number of advanced students. Students interested in work of this nature should consult with some member of the resident staff.

S 10. Problems in School Administration. Credit two hours. M W, 2-4:30. *GS 236.* Professor JORDAN.

A study of administration of school systems, together with problems peculiar to the administration of secondary schools. The course follows a four-year cycle of material, especially arranged to give graduate students a continuous four year course. Students may enroll in any unit of this course, and particular attention is paid to the needs of each group. Open, by permission of the instructor, to graduate students and to teachers of experience. Papers and reports required.

S 17. The Junior-Senior High School: Aims, Organization, and Curriculum. Credit two hours. Daily except Sat., 12. *GS 264.* Professor BROOKS.

Special emphasis will be placed upon the curriculum in its relation to the large aims of the secondary school. The complementary nature of the junior and senior high school will receive particular attention.

S 18. School Supervision. Credit two hours. Daily except Sat., 11. *GS 134.* Professor BROOKS.

The principles and applications of supervision of city and town school systems, involving problems of evaluation and improvement of teaching, and of subject matter. Open to both supervisory officers and teachers. The course will attempt to meet the particular needs of the class.

S 30. Teachers' Course in Social Studies in Senior High School. Credit two hours. Daily except Sat., 10. *GS 283.* Mr. KIDGER.

This course considers the content and method of teaching social studies in the senior high school. The interrelation of geography, history, and civics will be emphasized. Especial attention will be given to the most effective methods not only in presenting American history but also in dealing with problems of democracy. A consideration of individual method of measurements, and effective methods of testing, the use of outside reading, maps, charts, diagrams, note books.

S 226. Foundations of Method. Credit two hours. Daily except Sat. Section 1, 10, *GS 290.* Section 2, 11, *Caldwell 100.* Membership in section 2 is limited to graduate students. Professor MOORE and Dr. BRUCE.

This course is designed primarily for experienced elementary and high school teachers and supervisors. It will include a critical examination of current and proposed educational methods in the light of accepted principles of educational psychology. Special attention will be given to the theories involved in project-teaching. The course will include such topics as the laws of learning, interest and effort, the thinking process, the organization of experience, the relationship between subject matter and the educative process, discipline and moral training.

S 125. The Teaching of Reading. Credit two hours. Daily except Sat., 2-3:30, *Caldwell 143.* Professor CHAMPLIN.

This course deals with the various phases of the reading process. Attention will be given to diagnosis, remedial work, types of reading, materials suitable for the various grade levels, recent investigations and recommendations. The course is designed for teachers, principals, and supervisors.

ADDITIONAL COURSES IN EDUCATION

Attention is called to the announcement of the Department of Rural Education on p. 69. In addition to courses of strictly rural character, a number of courses of general educational nature are open to all students of the Summer Session.

TEACHERS' COURSES IN HIGH-SCHOOL SUBJECTS

The following courses are offered for teachers desiring to study problems of instruction in different high-school subjects. The courses are planned also to meet the requirements of the New York State Department of Education in the issuance of the College Graduate Life Certificate.

TEACHERS' COURSE IN CHEMISTRY. See Chemistry S 180.

TEACHERS' COURSE IN ENGLISH. See English S 5.

TEACHERS' COURSE IN GEOGRAPHY. See Geography S 4.

TEACHERS' COURSE IN HISTORY. See History S 17.

TEACHERS' COURSE IN SOCIAL SCIENCE. See Education S 30.

TEACHERS' COURSE IN HEALTH EDUCATION. See Health Education S 4.
TEACHERS' COURSE IN LATIN. See Latin S 1.
TEACHERS' COURSE IN MATHEMATICS. See Mathematics S 20.
TEACHERS' COURSE IN MUSIC. See Music S 20, S 23.
TEACHERS' COURSE IN PHYSICS. See Physics S 90.
TEACHERS' COURSE IN PUBLIC SPEAKING. See Public Speaking S 3, S 9.
TEACHERS' COURSE IN ROMANCE LANGUAGES. See Spanish S 31.

PHYSICAL EDUCATION

Attention is called to the courses in Physical and Health Education on pages 40-42 of this announcement.

ENGINEERING

The courses in engineering described below are equal in character to corresponding courses given in the College of Engineering during the regular session. They will be accepted for credit towards graduation by the several schools of the college so far as they apply to the prescribed work of the school concerned. Students in the College of Engineering who may desire to offer work done in the Summer Session toward graduation should consult the Director of the school in which they are regularly registered before registering in the Summer Session. Others may obtain information concerning these courses by applying to the Secretary of the College of Engineering.

Additional courses in Structural Engineering and in Hydraulics may be arranged to meet the needs of graduate students.

DRAWING

S 3. **Elementary Engineering Drawing for Secondary Schools.** Drawing Room open daily except Saturday 8-12, daily except Wednesday and Saturday 2-4:30. Hours to suit. *East Sibley 207.* Professor TOWNSEND.

This course is designed for those who wish to teach mechanical drawing in secondary schools and for those who feel the need of a more complete knowledge of this subject to assist them in teaching shop work. Some of the topics covered are use of instruments, lettering, orthographic and isometric projection, inking, tracing, conventions, and working drawings. Students familiar with these topics may elect a more advanced course.

Students must be provided with a set of drawing instruments, an architect's scale, a $30^\circ \times 60^\circ$, and a 45° triangle.

S 123. **Engineering Drawing.** Hours the same as for S 3. *East Sibley 207.* Professor TOWNSEND.

A course in drawing for beginners, covering lettering, use of instruments, orthographic projection, free-hand sketching of machine parts, tracing, drawing conventions, working drawing. The content of this course is equivalent to that of Drawing 123 given during the regular term.

S 125. **Engineering Drawing.** For candidates for the degree of B. Chem. Hours the same as for S 3. *East Sibley 207.* Professor TOWNSEND.

Content of the course the same as S 123 with the substitution of isometric projection and a problem in piping and pipe conventions. The content of this course is the same as Drawing 125 of the regular term.

DESCRIPTIVE GEOMETRY

S 10. **Descriptive Geometry.** Lectures, daily except Sat., 9. Recitations and drawing, daily except Sat., 10-12, and 2-5. *Lincoln.* Assistant Professor POND.

A study of the representation of lines, planes, surfaces, and solids, and their interrelations. Warped surfaces, tangencies, intersections, and perspective. The work is the same as that given in the regular C.E. courses 205 and 206; and the student will receive four hours of credit if he takes the whole course. A three-hour course that does not include perspective, and fulfills the requirements of course 124 of the Sibley School of Mechanical Engineering and the School of Electrical Engineering will also be given from 2 to 5 P. M. The morning and afternoon sessions make it possible to readjust the schedule so as to accommodate

nearly all who may wish to take either course. Those who take course 124 may do their work in the 9-12 period.

KINEMATICS

S 313. **Kinematics.** Credit three hours. This course is the equivalent of 313 and must be taken with course S 314. Prerequisite courses Physics 6, 330, 311, and 124. Eight recitations a week on the theory of mechanisms, instant centers, cams, gears, linkages, velocity and acceleration diagrams. Daily except Sat., 9, and M W F, 12. *East Sibley 103.* Professor ROGERS.

S 314. **Kinematic Drawing.** Credit two hours. This course is the equivalent of 314 and must be taken with course S 313. Prerequisite courses Physics 6, 330, 311, and 124. Drawing board application of the theory and principles of course S 313 in the construction of cams and gears, the solution of linkage and instant center problems, and the determination of velocity and acceleration diagrams, etc. Any five of the following three-hour drawing periods: T Th, 10-1, M T W Th F, 2-5. *East Sibley 103.* Professor ROGERS.

MECHANICS OF ENGINEERING

The following courses in Mechanics of Engineering are open to students from other universities, subject to the same requirements for admission as are made for Cornell students. See the Announcement of the College of Engineering for more detailed description of Courses 220, 221, 223, 330, and 331. Professors RETTGER and GARRETT, Assistant Professor PERKINS, and ———. Office, *Lincoln 33 C.*

S 220. **Mechanics.** Credit six hours. Equivalent to C.E. 220. Recitations, daily, 9 and 12; and three computing periods a week.

S 221. **Mechanics.** Mechanics of Materials. One section. Credit four hours. Equivalent to C.E. 221. Prerequisite course 220 or the equivalent. Recitations, daily except Sat., 8 and 11; and two computing periods a week. See S221A.

S 221 A. **Mechanics Laboratory.** Equivalent to C.E. 221A. Must be taken with S 221. Hours to be arranged.

S 223. **Engineering Problems.** Credit two hours. Equivalent to C.E. 223. Five computing periods a week. Will be given only if enough students register for the course.

S 330. **Mechanics.** Credit six hours. One section. Twelve recitations a week and three computing periods. Equivalent to M. E. 330. Recitations, daily, 9 and 12. Computing periods to be arranged.

S 331. **Mechanics of Materials.** Credit five hours. One section. Eleven recitations and two computing periods a week. Equivalent to M. E. 331. Prerequisite course 220 or 330, or the equivalent. Recitations, daily, 8 and 10. Computations to be arranged.

MATERIALS OF CONSTRUCTION

S 225. **Materials of Construction.** Credit three hours. The materials studied are: Lime, cement, stone, brick, sand, timber, ores, cast iron, wrought iron, steel, and some of the minor metals and alloys. The chemical and physical properties, uses, methods of manufacture, methods of testing, and unit stresses of each material are considered, particular emphasis being laid on the points of importance to engineers. Daily at hours to be arranged. Professor SCOFIELD.

S 226. **Materials Laboratory.** Credit three hours. Prerequisite course S 221 and must be taken with or preceded by 280. Experimental determination of the properties of materials by mechanical tests. Study of testing machines (their theory, construction, and manipulation); calibration of testing machines and apparatus; commercial tests of iron and steel; tensile, compressive, torsional, shearing, and flexure tests of metal and various woods with stress-strain observations; tests of cement, concrete aggregate, concrete, plain and reinforced, and of road material and paving brick. The course is planned to supplement Course S 225 with its study of the properties of materials by the actual handling of the

materials and by observations of their behavior under stress. Laboratory work. Hours to be arranged. Professor SCOFIELD.

HYDRAULICS

S 240. **Hydraulics.** Credit four hours. Prerequisite courses 220, 221, or 330, 331. Five recitations and three computing periods a week. Ten demonstration lectures are given in periods to be arranged. Daily except Sat., 10; M W F, 2-4:30. The Schools of Mechanical and Electrical Engineering will accept this course for 334 or 335. Professor SCHODER.

Hydrostatics, including stability of gravity dams, immersion and flotation, gas volumes and pressures; flow of liquids through orifices, nozzles, Venturi meters, pipes, and over weirs; time required to fill and empty tanks and canal locks; simple, compound, branching, and looping pipes; elementary power calculations in common pumping and fire protection problems. Flow of water in open channels. Elementary consideration of modern water wheels.

STRUCTURAL ENGINEERING

S 270. **Structural Design and Bridge Stresses.** Credit four hours. Lectures, recitations, computations, and drawings at hours to be assigned. *Lincoln* 14 and 29. Prerequisite C.E. 220, 221. Assistant Professors BURROWS and O'ROURKE.

One-fourth of the course includes structural details, i.e., the design of a wooden roof truss and other timber joints. The remainder of the course includes dead load, live load, and impact stresses in simple bridge trusses due to uniform live panel loads, locomotive axle loads, and highway loads.

S 271. **Structural Design.** Credit three hours. Lectures, computations, and drawing. Daily, at hours to be assigned. *Lincoln* 14. Prerequisite C.E. 270. Assistant Professor BURROWS.

An elementary course in steel design. Complete design, detail drawing, bill of material, and estimate of weight of a steel roof truss, a through and a deck-plate girder bridge.

S 274. **Bridge Design.** Credit three hours. Computation and drawing, daily, at hours to be arranged. Prerequisite C.E. 271. Assistant Professor BURROWS.

Computations and drawing for the complete design of a railroad or highway bridge of six or seven panels, the stresses for which were computed in connection with the previous study of bridge stresses. The computations to determine the sections of all members and of pins, pin plates, splices, and other details as well as of connecting rivets are to be written up in systematically arranged reports. The drawing consists of general plans showing the location of all rivets as well as the composition and relation of all members and connections. The final reports are to give a full list of shapes and plates, and a classified analysis of weight for the span.

S 280. **Concrete Construction.** Credit three hours. Daily, at hours to be arranged. Prerequisite courses C.E. 220, 221, (see announcement of S 226). Professor URQUHART and Assistant Professor O'ROURKE.

Concrete materials, properties of plain concrete, its making and deposition; elementary theory of reinforced concrete as applied to columns, rectangular beams, and slabs; T-beams reinforced for compression; direct stress combined with flexure.

S 281. **Masonry and Foundations.** Credit three hours. Daily except Sat., 8. Prerequisite courses 220 and 221. Piles and pile driving, including timber, concrete, tubular, and sheet piles; cofferdams; box and open caissons; pneumatic caissons for bridges and buildings, caisson sinking, and physiological effects of compressed air; pier foundations in open wells; freezing process; hydraulic caissons ordinary bridge piers; cylinders and pivot piers; bridge abutments; spread footings for building foundations; underpinning buildings; subterranean explorations; unit loads. Textbook Jacoby and Davis's *Foundations of Bridges and Buildings*. Recitations, collateral reading in engineering periodicals, and illustrated reports. Professor URQUHART

S 282. Reinforced Concrete Building Design. Credit three hours. Daily, at hours to be arranged. Prerequisite course C.E. 280. Assistant Professor O'ROURKE.

Design of a reinforced concrete flat-slab building and an investigation of various other types of floor systems for commercial buildings. Complete detail design for one building, including stairways, elevator shafts, penthouses, etc. Working drawings and steel schedules.

S 285. Reinforced Concrete Design. Credit three hours. Daily at hours to be arranged. Prerequisite course 280. Professor URQUHART.

Theory and design of gravity, cantilever, and counterfort retaining walls. Design of multiple column footings of reinforced concrete. I-beam grillages. Design of bins and tanks: subsurface and supported on towers. Reports and sketches.

ENGLISH

Courses S 1 and S 2 taken together will be considered the equivalent of the first term of Course 1 or of Course 3 in the regular University session.

Courses in brackets are not given in the summer of 1928 but may be expected in the summer of 1929.

S 1. Composition. Credit two hours. Daily except Sat., 8. GS 142. Mr. BALDWIN.

A practical drill intended for those who lack proficiency in writing; discussions of the elements and forms of discourse; frequent exercises, mainly expository; personal conferences at hours to be appointed.

S 2. Introductory Course in Literature. Credit two hours. Daily except Sat., 9. GS 142. Mr. BALDWIN.

An introduction to the study of literature, dealing chiefly with selected works of Chaucer, of Shakespeare, and of Milton.

S 4. Advanced Composition. Credit two hours. Daily except Sat., 11. GS 164. Mr. KESSEL.

The planning, writing, and criticism of essays and of other exercises in composition, accompanied by a study of general principles of writing and of questions of English usage. Open only to teachers and to students who have had one year of college English.

S 5. Teachers' Course. Credit two hours. Daily except Sat., 10. GS 156. Professor NORTHUP.

Lectures, readings, reports, and discussions. Designed for those who are teaching or who expect to teach English in schools. The organization of the high school course in English; methods of treating the works named by the Conference on Uniform Entrance Requirements in English; the teaching of literature in general; supplementary reading for pupils and teacher; the use of the school library and the public library; stage productions; the place of language and grammar in the high school; problems of oral and written composition; the relation of composition to literature and to other subjects in the curriculum.

S 6. Nineteenth Century Poetry. Credit two hours. Daily except Sat., 10. GS 183. Mr. KESSEL.

A study of the poetry of Wordsworth and Coleridge, and of their relation to the revolutionary movement and to the new birth of English poetry. Texts: *The Poetical Works of Wordsworth*; *The Poetical Works of Coleridge*, Oxford edition.

S 7. Nineteenth Century Poetry. Credit two hours. Daily except Sat., 11. GS 156. Assistant Professor GREENE.

A study and discussion of the most important poems of Byron, Shelley, and Keats.

[**S 8. Modern Prose.** Credit two hours. Daily except Sat., 10. GS 162. A study of a few representative nineteenth century essays on the theory of prose style; illustrative readings in Newman, Ruskin, Pater, and Stevenson.]

S 10. Shakespeare. Credit two hours. Daily except Sat., 9. GS 156. Professor STRUNK.

A study of Hamlet, Othello, Lear, and Macbeth, with stress upon the art of Shakespeare as a playwright.

S 11. American Literature. Credit two hours. Daily except Sat., 8. GS 156. Professor SIBLEY.

A study of the American poets of the nineteenth century with particular attention to Bryant, Poe, Whittier, Longfellow, Lowell, Holmes, Emerson, and Whitman. Text: Page, *Chief American Poets*.

S 12. Victorian Literature. Credit two hours. Daily except Sat., 12. GS 160. Assistant Professor GREENE.

A study of some typical Victorian prose and poetry, including essays of Carlyle and Arnold, and poems of Clough, Swinburne, Morris, Rossetti, Arnold, Tennyson, and Browning.

S 16. The English Language. Credit two hours. Daily except Sat., 9. GS 162. Assistant Professor MONROE.

A study of essential features in the growth and development of the mother-tongue. Among the topics considered are: language and grammar in general; some misconceptions about the life of language; the relationships of English; phonetics, with practical exercises; the English vocabulary; inflections; native resources and foreign influences; disputed usages; the bearing of historical grammar on present forms and usages, spoken and written.

Recitations, lectures, collateral reading. The course does not require previous knowledge of Old or Middle English.

S 17. Modern Drama. Credit two hours. Daily except Sat., 11. GS 190. Professor STRUNK.

A study of some of the outstanding dramatists of our time: Ibsen, Benavente, Shaw, Pirandello. Discussion of the general principles of dramatic construction, and reading of assigned plays. Open only to those who rank as upperclassmen.

S 18. Old English. Credit two hours. Daily except Sat., 12. GS 162. Assistant Professor MONROE.

This course is intended for students who, lacking the opportunity hitherto, now wish by earnest effort to acquire some knowledge of English in its early form. Lessons in grammar are followed as soon as possible by the reading of easy prose of the time of Alfred the Great.

The course may be taken by undergraduates; and, with additional reading, by graduates as a part of their work for the master's degree. The time of meeting may be changed to suit the convenience of the class.

COURSES EXCLUSIVELY FOR GRADUATES

S 30. English Literature. For graduates only. Hours and room to be arranged. First meeting Wednesday, July 4, 3 P. M. GS 164. Professor NORTHUP.

Designed especially as an introduction to the graduate study of literature but open also to students who have already done some graduate work. The special topic for the present session is *The Theory and Criticism of Poetry*.

S 31. Elizabethan Literature. For graduates only. Hours and room to be arranged. Professor ADAMS.

A study of the non-dramatic literature of England from the beginning of the Renaissance to the close of Elizabeth's reign. Students should consult the instructor on registration day.

S 32. Methods and Materials of Research. Hours and room to be arranged. Professor ADAMS.

A study of scholarly procedure, and of books used in original investigation. Each student will be supplied with a subject and started on the preparation of his thesis.

S 33. Lyric Poetry. Open to graduates only. Daily except Sat., 10. GS 160. Professor SAMPSON.

A study of the content and form of English lyrics, with especial reference to the sonnet.

S 34. The Poetry of Thomas Hardy. Open to graduates only. Daily except Sat., 11. GS 160. Professor SAMPSON.

S 35. Writing in Theory and Practice. Open to graduates only. T Th, 3, or other hours to be arranged. First meeting Tuesday, July 3, 3 P. M. GS 160. Professor STRUNK.

Reports on topics connected with English prose style; discussion and criticism of the student's own writing.

GEOGRAPHY AND GEOLOGY

The lecture rooms and laboratories are in *McGraw Hall*. It is the purpose of this department to meet, primarily, the needs of teachers in grammar schools, high schools, normal schools, and colleges. A second aim is to provide courses of practical and cultural value to college students. The work embraces lectures, laboratory, and field instruction in physical, commercial, and regional geography, and in the elements of geology; also educational methods in geography. The environs of Cornell University are rich in phenomena of geographic and geologic interest. Field excursions, consequently, are made an especially important part of the work of this department in the Summer Session. The laboratories are well equipped with apparatus and illustrative material for instruction. The material includes teaching and reference collections of minerals, rocks, fossils, maps, photographs, models, and more than five thousand lantern slides.

Students planning to take work in the department should, if possible, consult the instructor and register for courses on Saturday, June 30, at rooms indicated.

The attention of prospective students in the Summer Session who are especially interested in geographic and geologic studies is invited to courses given in other departments, courses which afford opportunities for additional instruction in these studies. Such courses are described in other pages of this pamphlet under the heads of ASTRONOMY and of METEOROLOGY AND CLIMATOLOGY.

LECTURE COURSES IN GEOGRAPHY AND GEOLOGY

S 1. Physical Geography. Credit two hours. Daily except Sat., 9. *Geological Lecture Room, McGraw Hall* (first floor, south end). Professor VON ENGELN.

An introductory course in physical geography, including discussion of the origin and form of the continents; the uplift and denudation of the land; the physiographic functions of the atmosphere, ground water, streams, winds, and glaciers; the glaciation of North America; the elements of oceanography.

The lectures in physical geography are fully illustrated by lantern slides and by wall and globe maps. Students registering in this course are advised to take also the related courses S 8 and S 10.

S 2. Industrial and Commercial Geography. Credit two hours. Daily except Sat., 11. *Geological Lecture Room*. Professor COBB.

This course deals with the importance of geographical environment and natural resources in their relation to the distribution of industries and to the development of commerce. Lectures and study of texts. Illustrated with lantern slides and maps.

S 3. Human Geography. Credit two hours. Daily except Sat., 8. *Geological Lecture Room*. Professor COBB.

A study of man's interaction with a varied and varying environment. Planned to give a broader and more critical understanding than that which is had from elementary texts of the relation of man to earth in different parts of the world. Lectures, reference readings, reports.

S 4. Aids to the Teaching of Elementary and High School Geography. Credit two hours. Daily except Sat., 10. *Physical Geography Laboratory*. Professor VON ENGELN.

A consideration of good geography teaching and of desirable methods; the essentials and principles of geography; topics found difficult by teachers, their explanation and presentation. Special consideration will be given to the content and problems of the new Regents' Syllabus for Geography in New York State. A course chiefly for teachers. Lectures, discussions, readings.

S 5. Geology. Credit two hours. Daily except Sat., 10. *Geological Lecture Room.* Professor ROWE.

An introductory course in geology, consisting of lectures and assigned readings upon the following topics: origin of the earth; geologic history of the earth; materials of the earth's crust and their arrangement, as well as the forces modifying them; vulcanism, earthquakes, and similar phenomena; development of life on the earth.

The lectures will be illustrated with lantern slides, models, maps, and specimens. Students registering for this course are urged to take the laboratory Course S 9 and, if possible, Course S 10. Credit for Geology course 100 regular session, will be allowed only for successful completion of all three courses S 5, S 9, S 10.

S 6. Mineral Resources. Credit two hours. Daily except Sat., 8. *General Geological Laboratory.* Professor ROWE.

A course in which the principal mineral resources both metallic and non-metallic of the United States will be discussed with reference to the following points: distribution, mode of occurrence, uses, relative importance, rank of the United States among nations of the world in production, and the influence of the various deposits upon the development of the regions in which they occur.

An exceptionally complete collection of specimens is available as illustrative material for this course.

S 7. Historical Geology. Credit two hours. Daily except Sat., 11. *General Geology Laboratory.* Professor LEIGHTON.

This course deals with the geographic conditions and the animal and plant life of the various subdivisions of geologic time. The development of the groups of the animal and vegetable kingdoms is traced throughout the geologic periods and studies made of fossils both in the collections and on field trips. The strata of the Devonian age may be studied on and near the campus, Silurian rocks on the Niagara and the Syracuse trips. This course may be taken alone or with either S 1 or S 5. Students taking it are urged to take S 10, as stratigraphic features are pointed out on all the field trips.

LABORATORY AND EXCURSION COURSES IN BOTH GEOGRAPHY AND GEOLOGY

S 8. Physical Geography, Laboratory Course. Credit one hour. T Th, 2-4. *Physical Geography Laboratory.* Miss BAKER.

The members of this class will make a study of the physiographic regions of the United States, using contour maps, models, and the experimental laboratory of the department. By such study topographic, regional, and life relationships (human, animal, and plant) will be correlated. There will be given also exercises on the other physiographic topics generally included in a laboratory study of the subject. The course will prove of worth to teachers of geography in the grades who wish to obtain a broader basis for their work in the subject as well as for those who expect to teach geography in the high schools.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

S 9. Geology, Laboratory Course. Credit one hour. W F, 2-4. *General Geology Laboratory.* Professor LEIGHTON and Assistant Professor STOW.

This course is designed to supplement course S 5. A study will be made of the more common structural phenomena; of the interpretation and uses of geological maps; of characteristic life forms developed in different geological periods; and of the more common rocks and minerals. Short field excursions will be made to collect both rock specimens and fossils.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

S 10. Geography and Geology, Field Course. This course should be elected by all those registering in Course S 1 or S 5. With courses S 1 and S 8 it affords a comprehensive course in physical geography; with courses S 5 and S 9 it will give a similarly broad training in elementary geology, as the dynamic phases of geology are emphasized on the excursions. Mimeographed outlines of the excursions are

to be secured by each student desiring credit. See also a pamphlet, obtainable in Ithaca, on *The Geography and Geology of the Cornell Region*. Professor LEIGHTON, Professor VON ENGELN, Professor ROWE, Assistant Professor STOW, and Miss BAKER.

Those desiring University or entrance credit must take field notes and hand in written reports. Excursions 1, 2, 3, 4, 5, are required of all students in the course, and in addition for one hour's credit they must make their own choice, the one excursion 7, Niagara, or both 6, Taughannock, and 8, Tully-Jamesville.

Meeting place and time announced in mimeographed outlines or by bulletin. Meet for first excursion, Monday, July 2, at McGraw Hall, 2:10 P. M. or East Ithaca R. R. Station, 2:30 P. M. Excursions 1-5, Monday afternoons; 6, 7, 8, all day Saturday. On the excursions to which a cost is attached persons wishing to go must register at the department and secure tickets in advance of the date of the trip. Announcements regarding field trips are posted on the South Door of *McGraw Hall* and all arrangements for reservations and tickets are made in the *Physical Geography Laboratory*. The trips are open to others besides the members of the excursion class as far as accommodations are available. Students desiring credit or certificates of attendance must register in S 10 and will be given preference in accommodations.

The longer excursions will be in charge of Professor LEIGHTON, with the co-operation and assistance of the other members of the instructing staff. On the excursions stops will be made at points of interest, explanations made, questions asked, and discussion invited.

OUTLINE OF EXCURSIONS: COURSE S 10

Monday Afternoons

1. **Eagle Hill.** To become acquainted with the lie of the land about Cornell, to learn the place names of the broader physiographic features, studying enroute processes of weathering, and, at the summit, the maturely dissected plateau. The top of the hill is a vantage point from which a good view of the lake and the land for miles to the north, east, and west may be had. July 2.

2. **Fall Creek and Deadhead Hill.** To study the origin and nature of sedimentary rocks, also processes of erosion, transportation, deposition, and cementation. An intimate view of one of the large gorges and its special features, particularly Ithaca Falls. July 9.

3. **Portland Point.** By auto-bus. To study rock structure; intrusion of igneous rocks into sedimentary formations; rock-folding and small scale faulting and associated phenomena; vein-formation; fossil content of strata; economic utilization for cement. July 16.

4. **Enfield Gorge and Falls.** By auto-bus. To study the relations of pre-glacial and hanging valleys and the postglacial and interglacial gorges, their origin and features. Joint-plane guidance of stream courses. A ride to the head of the gorge, climb through it to the lower end past the crest of Lucifer Falls. Enfield is perhaps the most picturesque and wildest of the gorges in the Cornell region. July 23.

5. **Terminal Moraine.** North Spencer. By auto-bus. To study a massive morainic loop, the basin in which the former ice tongue rested, and the outwash deposits and overflow channels to the south. Truncated valley sides due to glacial erosion. The most striking examples of glacial phenomena in the Cornell region. July 30.

All-day Excursions

6. **Taughannock Gorge and Falls.** By steamer. To study the Inlet Plain, its reclamation, the Barge Canal terminal, the position and succession of the Devonian strata along the lake shore, and the deep gorge and falls of Taughannock, one of the highest straight falls east of the Rockies. Luncheon at the foot of the falls. July 14.

7. **Niagara Falls and Gorge.** By train, trolley, and auto-bus. Open to all students in the Summer Session as far as accommodations are available. Registration for this excursion should be made early in the session. July 21, 22.

All important scenic features of Niagara Falls and Gorge are visited and their geology and physiographic history interpreted.

Before the trip, on Friday, July 20, at 4:30 P. M., a special meeting for those interested will be held in the *Geological Lecture Room*, when the different features to be seen on the excursion will be explained and illustrated with lantern slides and models. Students are advised to procure in advance a copy of the *Niagara Folio*, No. 190, in octavo form; cost fifty cents in coin or money order sent to Director, U. S. Geological Survey, Washington, D. C.

8. **Tully, Jamesville Lake, and Onondaga Escarpment.** By auto-bus. This trip provides for a study of morainic-loop topography at Varna and of an exceptionally well developed moraine at Tully associated with an outwash plain, the latter dotted with pit lakes. The state park, Clark Reservation, near Jamesville, is visited and the fossil Niagara with its plunge pool, Jamesville Lake, is studied. Here drainage from part of the Great Lakes and the ice front, during the Glacial Period, followed a course to the Hudson River. Further observations will be made of the Onondaga Escarpment, and drumlins at Syracuse. The return trip will be made by way of Skaneateles Lake. July 28.

GERMAN

S 1. **First Year German.** Grammar, composition, reading, oral training. Daily except Sat., 8 and 12. GS 183. Assistant Professor ANDREWS. Credit four hours. Entrance credit, one unit.

After successfully completing this course, students can, by supplementary reading during the summer, prepare themselves for the fall entrance examination in second year German.

S 3. **Third Year German.** Reading, grammar, composition, oral training. Daily except Sat., 8 and 12. GS 190. Professor FAUST. Credit four hours. Entrance credit, one unit (third unit).

Prerequisite: two years of high school German or its equivalent.

S 4. **Rapid Reading.** Daily except Sat., 9. GS 183. Credit two hours. Assistant Professor ANDREWS.

German texts of literary value will be read and translated, with casual comment upon their literary significance.

Prerequisite: three years of high school German or the equivalent.

S 5. **German Literature Since 1880.** Daily except Sat., 10. GS 177. Credit two hours. Professor FAUST.

Lectures in German with collateral reading. Beginnings: the lyric, novel, and drama. Foreign influences. The naturalists. Impressionism and expressionism.

German Readings. Interpretative readings from modern German literature will be given on Wednesday evenings at 8 o'clock in GS 190 by Professor FAUST.

GOVERNMENT

S 2. **Comparative Government.** Credit two hours. Daily except Sat., 9. GS 245. Professor MACKAY.

The governments of Great Britain, France, Switzerland, and Canada in comparison with that of the United States; modern tendencies in European government and politics such as Fascism and Bolshevism. The course assumes an elementary knowledge of American government.

S 14. **Introduction to International Relations.** Credit two hours. Daily except Sat., 11. GS 227. Professor MACKAY.

Political, economic, and other factors influencing the relations between states; relations between advanced and backward peoples; international organization, including the League of Nations and the World Court. Lectures, assigned readings, discussion of specific problems and of plans for promoting peace.

GREEK

S 1. Introduction to Greek and to the Reading of Homer. This course is intended (a) for graduate students who have had no Greek; (b) for high-school teachers of Latin who have had no opportunity for direct acquaintance with Greek and are therefore deprived of one of the chief sources of understanding and appreciating the content of the Latin authors whom they present in classroom; (c) for students of literature who desire by intensive work during a Summer Session to lay the foundations for a first-hand appreciation of the literary masterpieces of the Greek genius. Beginning with the alphabet, the course will give a thorough grounding in necessary forms, flexions, and syntax, and will proceed to the reading of a portion of the first book of Homer's *Iliad*. Credit two hours. Daily except Sat., 8. GS 124. Assistant Professor CAPLAN.

S 5. Greek and Roman Rhetorical Theory, Training, and Practice. Daily except Sat., 10. GS 124. Assistant Professor CAPLAN. See Latin, Course S 5.

HEALTH EDUCATION

See under Physical and Health Education, page 41.

HISTORY

S 1. The History of Rome to 138 A. D. Credit two hours. Daily except Sat., 9. GS 234. Professor LAISTNER.

This course will deal primarily with the political history of Rome to the death of Hadrian; it will also include a general survey of the social and economic development of Rome, Italy, and the provinces during the period.

S 2. The Social and Economic History of Greece to 323 B. C. Credit two hours. Daily except Sat., 10. GS 234. Professor LAISTNER.

This course is intended only for more advanced students, who have a general knowledge of the political history of Greece. A variety of topics will be considered, for example, trade, commerce, and industry; slavery; education; athletic and religious festivals.

S 3. Modern European History. Credit two hours. Daily except Sat., 10. GS 242. Professor BOURNE.

A general survey of the history of Europe from 1878 to 1914.

S 4. The French Revolution. Credit two hours. Daily except Sat., 11. GS 242. Professor BOURNE.

A descriptive study of the institutions of France during the Old Régime, followed by a study of the Revolution from 1789 to 1795.

S 7. English History from 1660. Credit two hours. Daily except Sat., 8. GS 221. Mr. MARCHAM.

Political, economic, and social life. Readings in contemporary literature. Primarily for sophomores and juniors.

S 8. Tudor and Stuart England. Credit two hours. Daily except Sat., 10. GS 221. Mr. MARCHAM.

Politics, the Renaissance and Reformation, the economic revolution. Readings in contemporary literature. Primarily for seniors and graduates.

S 10. The American Revolution. Credit two hours. Daily except Sat., 12. GS 234. Professor HODDER.

The causes and results of the American Revolution and the framing of the Constitution, the history of the period being considered as a chapter in the rise of democracy. Intended for upperclassmen and graduates.

S 11. The Prelude to the Civil War. Credit two hours. Daily except Sat., 11. GS 234. Professor HODDER.

The rise of abolitionism and the development of the controversy over slavery to its culmination in the Civil War, the history of the period being considered as another chapter in the growth of democracy. This course is intended for seniors and graduates.

S 12. **American History 1860-1875.** Credit two hours. Daily except Sat., 8. GS 234. Professor BRETZ.

The period of the Civil War and Reconstruction. C. R. Fish's *The Development of American Nationality* will be used as an outline.

S 13. **Seminary in American History.** Credit two hours. Daily except Sat., 10. GS 235. Professor BRETZ.

Chiefly for students who are preparing theses for the M. A. degree. Consult the instructor before registering.

S 17. **Contemporary History** and its teaching in the secondary schools. Credit two hours. Daily except Sat., 12. GS 277. Mr. KIDGER.

The history of Europe since the war: the Peace Treaty; the conferences of the premiers and of the ambassadors; the League of Nations; England; France; Italy; Germany; Austria; Hungary; Czechoslovakia; Jugoslavia; and Poland. Both in method and in content the course will be useful to teachers in secondary schools, especially such as teach the courses in world history prescribed by the new syllabus of the University of the State of New York.

S 30. **Teachers' Course in Social Studies.** See Education, page 26.

LATIN

The object of the Summer Session courses in Latin is twofold:

(a) To provide a series of courses, theoretical and practical, dealing with the professional training and equipment of the high-school Latin teacher who desires a thorough comprehension of the aims and of the technique of the recent developments in classical teaching in the secondary schools;

(b) To offer advanced courses, with direction of graduate work for those who are qualified to enter the Graduate School or to continue their work as candidates for the degree of Master of Arts with Latin as a major or a minor subject.

The attention of all Latin students is directed to the introductory course in Greek. See page 36.

S 1. **The Training of Latin Teachers and the Technique of Instruction in the Preparatory Years.** Lectures, discussions, and conferences. The objectives in secondary Latin instruction and the evaluation of these objectives; standards and means of determination of progress, and the validity of various types of test in indicating measure of success in instruction. Credit two hours. Daily except Sat., 9. GS 128. Professor DURHAM.

The credit of two hours carried by this course is countable toward the group of six semester hours in General and Special Methods required by the New York State Department of Education as part of the prerequisite for the Professional Certificate for high school teaching. Similar credit in an elective group will be recognized by the State of Pennsylvania. Students from states where other requirements for teachers' certificates are in force are advised to secure in advance from their own school authorities an indication that this course will be counted towards the satisfaction of their particular professional requirements.

S 2. **Lectures on Latin Syntax; Latin Composition.** For graduate students, and in general for high-school teachers of Latin who desire an independent treatment of the basic syntactical usages of classical Latin, along with written practice in turning English into idiomatic Latin. The work in Oral Composition will include actual conversation appropriate for classroom use during the preparatory years. Credit two hours. Professional credit for this course will be similar in amount and nature to that carried by Course S 1. Daily except Sat., 11. GS 128. Professor DEFERRARI.

S 3. **Vulgar Latin.** Introductory lectures on phonetics followed by a consideration of the characteristics of the Latin spoken language. Reading of representative texts and selections. Primarily for graduate students, candidates for the master's degree. Credit two hours. Daily except Sat., 10. GS 128. Professor DURHAM.

S 4. **Lectures on Latin Poetry: Elegiac Poetry; Origin and History of the Elegy.** Primarily for graduate students in Latin. Properly qualified students

in other fields may be admitted on personal application. Credit two hours. Daily except Sat., 12. GS 120. Professor DEFERRARI.

S 5. **Greek and Roman Rhetorical Theory, Training, and Practice.** For graduate students and for teachers of Cicero's orations. Lectures; study of rhetorical and oratorical works, chiefly in English translation. Credit two hours. Daily except Sat., 10. GS 124. Assistant Professor CAPLAN.

NOTE: Those who wish to begin their candidacy for the degree of Master of Arts are invited to correspond in advance with Professor Durham or Professor Caplan, and are requested to bring with them at the opening of the Summer Session such credentials of undergraduate work leading to the degree A.B. as will entitle them to admission to the Graduate School.

MATHEMATICS

Each teacher will have a daily office hour for consultation with students. It is urged that this opportunity be utilized by all concerned.

In the following list, courses S 1 to S 5b are the equivalent of courses having the same numbers in the *Announcement of the College of Arts and Sciences* for 1927-28.

Courses S 1, S 2, S 3, are planned for those teachers in the secondary schools who wish to review these subjects. They are equivalent to the advanced entrance requirements of Cornell University and of the College Entrance Examination Board. They presuppose a ready knowledge of elementary and intermediate algebra and of plane geometry. University credit for S 1, S 2, S 3, three hours each.

Students taking S 5a or S 5b are requested to take no other University work during the session without special permission. University credit for S 5a, S 5b, five hours each.

S 1. **Solid Geometry.** Daily, 10. *White* 28. Professor SHARPE. (Office hour, 11, *White* 29.) *White* B 1. Mr. SCHUG. (Office hour 9, *White* B 4.)

S 2. **Advanced Algebra.** Daily, 9. *White* 6. Professor HURWITZ. (Office hour, 10, *White* 8.) *White* 10. Professor CARVER. (Office hour, 10, *White* 12.) *White* 9, Mr. LANE. (Office hour, 10, *White* 11.)

S 3. **Trigonometry.** Daily, 8. *White* 5. Assistant Professor CRAIG. (Office hour, 10, *White* 4.) *White* B 1. Mr. BEISEL. (Office hour, 9, *White* B 4.)

S 5a. **Analytic Geometry and the Calculus** (First term's work). Daily, 8 and 11. *White* 1. Professor GILLESPIE. (Office hour, 10, *White* 3.)

S 5b. **Analytic Geometry and the Calculus** (Second term's work). Daily, 8 and 11. *White* 21. Mr. AGNEW. (Office hour, 10, *White* 23.) *White* 25. Mr. JEFFERY. (Office hour, 10, *White*, 23.)

S 20. **Teachers' Course.** Credit two hours. Daily except Sat., 11. *White* 24. Professor SNYDER. (Office hour, 10, *White* 26.)

The course will comprise selected topics in the subjects of secondary school mathematics, including constructions by ruler and compass and the solution of equations. The mutual dependence of algebra and geometry in the solution of problems will be emphasized.

ADVANCED COURSES

S 24. **Theory of Equations.** Credit three hours. Daily, 9. *White* 28. Professor SHARPE. (Office hour, 11 *White* 29.)

An elementary course which will include solutions of the cubic and quartic; covariants and invariants; solution of equations with numerical coefficients; Sturm's theorem; determinants and eliminants.

S 41. **Elementary Differential Equations.** Credit three hours. Daily, 11. *White* 5. Assistant Professor CRAIG. (Office hour, 10, *White* 4.) A first course in ordinary differential equations; knowledge of the calculus is presupposed.

S 42. **Advanced Calculus.** Credit three hours. Daily, 12. *White* 6. Professor HURWITZ. (Office hour, 10, *White* 8.) The logical foundations of the

calculus; definitions and properties of limits, continuity, derivatives, and integrals.

S 45. **Theory of Functions of a Complex Variable.** Credit three hours. Daily 10. *White* 25. Professor HUTCHINSON. (Office hour, 11, *White* 26.) Mathematics S 5b, or its equivalent, is prerequisite. An elementary course, based on Goursat's *Functions of a Complex Variable* (translated by Hedrick). Those intending to take the course should obtain a copy of the book beforehand.

S 61. **Projective Geometry.** Credit three hours. Daily, 8. *White* 10. Professor CARVER. (Office hour, 10, *White* 12.) The principles underlying projective forms of the first and second degrees will be discussed. Although no knowledge of mathematics beyond plane geometry will be presupposed, additional training is highly desirable.

READING AND RESEARCH COURSES

In addition to the preceding courses, the teachers of mathematics offer the following opportunities to graduate students. Instruction will consist of conferences by appointment, direction of reading, and proposing definite problems for research. A regularly registered student may, by arrangement, obtain academic credit for any of these courses; the number of hours of credit will depend on the amount of work done.

100. **Functions of a Complex Variable.** Professor HUTCHINSON, Assistant Professor CRAIG.

100. **Algebraic Curves and Surfaces.** Professor SNYDER. Regular daily conferences on selected topics in the theory of algebraic correspondences, birational transformations, and involutions will be held, with main emphasis on present day problems.

100. **Applied Mathematics.** Problems in thermodynamics: heat, electricity, and elasticity. Professor SHARPE.

100. **Foundations of Geometry and Problems in Synthetic Geometry.** Professor CARVER.

100. **Functions of a Real Variable, Point-Sets, Calculus of Variations.** Professor GILLESPIE.

100. **Advanced Analysis.** Problems in the theory of functions, differential equations, and integral equations. Professor HURWITZ.

MUSIC

S 10. **Harmony.** Credit two hours. Daily except Sat., 8. *Morse* 105. Assistant Professor MEAD.

A course dealing with the construction and interconnection of triads and chords of the seventh.

S 14. **Musical Appreciation, Form, and Design.** Credit two hours. Daily except Sat., 11. *Morse* 105. Professor WHITTAKER.

A discussion of musical style; form and content in music. The course is intended to furnish a rational basis for the appreciation of musical masterpieces of all schools.

S 18. **History of Modern Music.** Credit two hours. Daily except Sat., 12. *Morse* 105. Professor WHITTAKER.

The development of music from Bach to the present day.

S 20. **Music in the Public Schools.** Credit two hours. Daily except Sat., 9. *Morse* 105. Professor WEAVER.

An introduction to the general problem of school music: its value as an educational subject; principles underlying classroom methods; practical suggestions for elementary and high school situations.

S 23. **Teachers' Course in Appreciation of Music.** Credit two hours. Daily except Sat., 10. *Morse* 105. Professor WEAVER.

An exposition of the methods which may be used to advantage in arousing real appreciation of pupils for the best forms of music.

Chorus. The Department of Music will organize and maintain a choir for the services in Sage Chapel at 11 o'clock each Sunday morning during the Summer Session. Applications for admission to this choir will be received in Sage Chapel on Tuesday, July 3 from 9:30 to 12:30 and 2:30 to 5:00. The rehearsals will be held on Thursday at 5 o'clock and on Sunday at 10. All students having voices and desiring to sing are urged to become members of this choir.

All students in the Summer Session who are interested in forming a large summer chorus are asked to report to Professor Weaver in *Morse Hall* during the first three days of the session.

PHILOSOPHY

S 1. Ancient and Medieval Philosophy. Credit two hours. Daily except Sat., 8. *GS 225.* Assistant Professor SMART.

A general survey of the chief systems of philosophical thought from 600 B.C., to the Renaissance. For juniors, seniors, and graduates. Lectures, readings, and reports.

S 2. History of Modern Philosophy. Credit two hours. Daily except Sat., 9. *GS 225.* Professor CUNNINGHAM.

A general survey of the chief systems of philosophical thought from Descartes to Hegel. Recent tendencies will be outlined as time permits. For juniors, seniors, and graduates. Lectures, readings, and reports.

S 3. Philosophies of Life. Credit two hours. Daily except Sat., 10. *GS 225.* Assistant Professor SMART.

An analysis of some of the chief tendencies in ethical theory throughout the ages: Stoicism, Epicureanism, utilitarianism, pessimism, idealism, etc. An introductory course.

S 4. Recent British and American Idealism. Credit two hours. Daily except Sat., 11. *GS 225.* Professor CUNNINGHAM.

A somewhat intensive study of idealistic systems in recent British and American philosophy, with references to other points of view as they bear upon those systems. A semi-advanced course primarily for seniors and graduates. Lectures, readings, and occasional reports.

PHYSICAL AND HEALTH EDUCATION

The following courses are designed primarily for teachers and supervisors of physical education in public schools, and for students who wish to supplement the preparation they may have received in colleges or professional schools. The courses are also open to other students and to teachers who may wish to take either the theory or practice courses or both, and whose application has been approved by the Chairman of the Summer Session.

S 1. History—How Men Have Lived. Credit two hours. Daily except Sat., 8. *GS 134.* Professor YOUNG.

An historical survey of the distinguishing characteristics of various peoples as to habits of living and forms of physical activity, and the part these have played in their national development.

S 2. Modern Developments in Physical Education. Credit two hours. Daily except Sat., 9. *GS 134.* Professor YOUNG.

The history of modern physical education in Europe and in America and some of its present-day problems.

S 3. Organization, Administration, and Methods of Teaching Physical Education. Credit two hours. Daily except Sat., 10. *GS 134.* Professor CLAPP.

The aims and relative values of various phases of Physical Training in the educational program. Detailed study of organization and administration of Physical Education with special reference to high school problems. Methods of teaching and selection of material for floorgymnastics and general recreative work.

S 4. Organization and Administration of Playgrounds and Play Activities. Credit two hours. Daily except Sat., 2. *GS 134.* Professor CLAPP.

The social and educational values of play. Principles of organization, administration, and selection of activities in community centers, public schools, and colleges. The organized camp and its place in the educational program.

S 5. Physical Training in the Public School. Credit two hours. Daily except Sat., 12. *GS 134.* Dr. ANDERSON.

Methods of teaching, plan of organization of classes, selection and grading of pupils. Selection of suitable exercises, daily programs, lesson content, classification of exercises, etc.

S 6. Measurements of School Children. Credit one hour. M W F, 10. *GS 120.* Professor YOUNG and Dr. ANDERSON.

Physical measurements and their practical application to problems of growth and development.

S 7. Physiology of Exercise. Credit one hour. M W F, 12. *Stimson.* Dr. GOULD.

The nature and importance of the processes taking place in the body during muscular exercise; effects of exercise upon the heart and blood vessels; the co-ordination of the circulation and respiration; the after-effects of exercise.

S 8. Kinesiology and Corrective Exercises. Credit two hours. Daily except Sat., 11. *Stimson.* Dr. GOULD.

This course deals with the principles and mechanisms of bodily movements. The mechanism of representative types of exercise is studied for the purpose of determining as far as possible their effects upon health. Exercises for the correction of functional bodily deformities are studied.

S 9. Human Anatomy. Credit three hours. Daily except Sat., 8-10. *Stimson.* Dr. GOULD.

A course in the gross anatomy of the body presenting a general knowledge of the relations of the bones, muscles, nerves, and blood vessels. The viscera of the body will be considered in connection with the systems of which they are a part.

The course will consist of lectures and demonstrations with the dissected cadaver, anatomical charts, models, and museum preparations.

S 11. High School Athletics (Men). Daily except Sat., 3:00-4:30. *Old Armory and Athletic Field.* Dr. ANDERSON.

Practical coaching in football, track, basketball, and soccer, including rules, methods of selection, plays, training, etc.

S 12. Swedish and Danish Gymnastics, with tactics. (Women). Daily except Sat., 12. *Sage Gymnasium.* Miss BATEMAN.

S 13. High School and College Athletics (Women). Daily except Sat., 5. *Women's Athletic Field.* Miss BATEMAN.

Practical coaching in track, hockey, basketball, archery, or fencing. Instruction will be given only in those sports for which there is the largest registration.

S 14. Folk Dancing. Daily except Sat., 3. *Sage Gymnasium.* Miss BATEMAN.

S 15. Aesthetic Dancing. Daily except Sat., 4. *Sage Gymnasium.* Miss BATEMAN.

S 16. Swimming. For women, *Sage Gymnasium*, 9-12 A. M., 2:30-5 P. M. Mr. GELAS.

Instruction in swimming and life saving for individual training and for teaching will be given at hours to be arranged with each applicant by appointment. For this instruction a special charge of ten dollars is made.

S 18. Tennis. For men and women. *Risley Courts.* By appointment. Mr. MULLER.

Instruction in the fundamentals of tennis, either individually or by pairs. For a series of twelve lessons a special charge of ten dollars is made.

HEALTH EDUCATION

S 1. Hygiene of the School Child and Adolescent. Credit two hours. Daily except Sat., 9. *Stimson.* Dr. SMILEY.

In this course an attempt will be made to present the principles of personal hygiene as they apply to the health instruction and health maintenance of the child or adolescent in his school life. Prerequisites suggested, Biology and Physiology.

S 2. Health Inspection of School Children. Credit two hours. Daily except Sat., 8. *Stimson*. Dr. JENNETTE EVANS.

A practical course of lectures and demonstrations designed to familiarize the student with the facts and methods necessary for making an effective health inspection of school children. Prerequisites suggested but not demanded, Human Physiology, Human Anatomy.

S 3. First Aid and Safety First. Credit one hour. M W F, 9. *Stimson*. Dr. JENNETTE EVANS.

This course will include a discussion and practical demonstration of the main methods at hand for preventing accidents and for giving emergency treatment.

University credit will be given in the courses as indicated, subject, however, to the rules and regulations of the colleges in which a degree is sought.

The following subjects, which are required for the New York State Teacher's Certificate in Physical Education, and for which regular University credit is given, are offered in the Summer Session: Education, English, Foreign Language, Chemistry, Physiology, History, Biology, Psychology, Educational Psychology, Zoology, Economics.

S 4. Teachers' Course. Credit two hours. Daily except Sat., 12. *Stimson*. Dr. SMILEY.

Lectures and discussions on the methods and materials for the teaching of personal and community hygiene in the elementary and secondary schools. Prerequisites suggested but not demanded General Biology S 1, Health Education S 1, Elementary Human Physiology.

PHYSICS

Demonstration Lectures. A series of experimental demonstrations covering the entire field of Physics. Little time will be spent on the development of the related theory, this being left for the classroom work of the course described below. Teachers may find in these demonstrations valuable suggestions for their own work. These lectures are a required part of course S 6. Daily, 8. *Rockefeller* A. Assistant Professor HOWE.

S 6. Introductory Experimental Physics. Credit six hours. Demonstration lectures, recitations, and laboratory work. Lectures, daily, 8. *Rockefeller* A. Recitations, daily, 9; quiz, M, 10-12. *Rockefeller* 107. Assistant Professor HOWE. Laboratory, three two-hour periods a week. Section A, T W, 10-12 and F, 2-4; Section B, Th F, 10-12 and T, 2-4. *Rockefeller* 220. Mr. ZELLER. Fee, \$5.

This course is the substantial equivalent of courses 3 and 4 and of course 6 as given in the regular session.

Teachers of secondary school physics may, with the approval of the professors concerned, substitute the work of course S 90 for the recitations of S 6.

S 29. General Physics. Credit two hours. Theory and problems covering selected topics in magnetism and electricity. It is recommended that Physics S 65 be taken simultaneously with Physics S 29. Prerequisites, Physics 6, or its equivalent, and calculus. Recitations, daily except Sat., 8. *Rockefeller* 106. Professor LOVING.

S 34. Physical Measurements. The schedule of experiments comprising this course may be taken in Physics S 65, which see.

S 55. Physical Experiments. Credit two hours. For teachers of elementary physics and for others wishing a greater familiarity with laboratory work. T W Th, 10-12:30. *Rockefeller* 252. Professor LOVING. Fee, \$8.

A general laboratory study of the fundamental physical laws and constants, partly from the qualitative, partly from the quantitative point of view. The work

may be varied to suit the interest of the student, since the instruction is in all cases individual. This course presupposes a knowledge of introductory physics.

S 65. Physical Measurements. Credit one to four hours. Primarily for teachers and students who wish a thorough introduction to the theory and methods of physical measurements. Prerequisites, the equivalent of eight hours of college physics and a knowledge of the elements of calculus. One to four three-hour periods a week. M W, 2-5; T Th, 9-12. *Rockefeller* 252. Professor LOVING. Fee, \$2.50 a credit hour.

The methods of setting up and adjusting apparatus, the study of sources of error and their elimination, methods of computation, the interpretation of results, both analytically and graphically, have special emphasis. The instruction is individual and the topics covered may be adjusted to meet the needs of the student.

S 90. Teachers' Course. Credit two hours. Lectures, discussions, and conferences, with emphasis upon the selection, organization, and presentation of subject-matter and practice in the care and manipulation of apparatus in classroom and laboratory. Daily except Sat., 9. *Rockefeller* 108. Mr. ZELLER.

Conferences, individual or by groups, may be arranged for the discussion of practical problems suggested by members of the class. Teachers are advised to bring with them a copy of the textbook which they are using.

Teachers of secondary school physics may, with the approval of the professor concerned, combine this course with S 6, which see.

S 106. Advanced Laboratory Practice. Open to students who have had Physics S 65 (four hours of credit) or its equivalent. Credit varies with the amount of work done. The laboratory is open daily except Sat., 9-12. *Rockefeller* 301. Assistant Professor COLLINS. Fee, \$5 a credit hour.

This course is intended to meet the requirements of the following classes of students: (1) those wishing to take up special topics for detailed study; (2) those taking Course S 112 or S 121 and desiring to supplement that work in the laboratory; (3) those who wish to develop their laboratory technique in preparation for research.

[The sequence of courses S 111 to S 140 is intended to run through three summer sessions. The schedule for the next three summers is: 1928, S 121 and S 112; 1929, S 122 and S 140; 1930, S 130 and S 111. The courses are of the same general character as the corresponding courses given in the fall and spring terms but include somewhat fewer topics. The selection of these topics will be influenced by the interests and needs of the class. To profit by these courses a student should have a knowledge of calculus and should have completed courses in general physics covering the principal topics of the subject. A student who contemplates electing any of these courses is advised to correspond with the department about his preparation for the work. These courses, as also S 106, S 400, S 415, and S 500, may be taken for credit toward a master's degree in Physics, subject to the requirements of the graduate school. See the *Announcement of the Graduate School*.]

[S 111. Mechanics. Credit two hours. An introductory study of analytical mechanics and terrestrial and universal gravitation based upon Jean's *Theoretical Mechanics*.] Not given in 1928.

S 112. Properties of Matter. The analysis of stresses and strains and some applications; surface tension; the motion of fluids and the effects of viscosity. Daily except Sat., 9. *Rockefeller* 103. Professor GIBBS.

S 121. Electricity and Magnetism. Electrostatic and magnetic fields, direct current phenomena; gaseous, electrolytic, and metallic conduction; chemical and thermal electromotive forces. Daily except Sat., 8. *Rockefeller* C. Assistant Professor COLLINS.

[S 122. Electricity and Magnetism. Electromagnetism, variable current phenomena, electric oscillations.] Not given in 1928.

[S 130. Light. Geometrical optics; thick lenses; optical instruments. Physical optics: interference, diffraction, polarization. Houston's *Treatise on Light* will be used as a text.] Not given in 1928.

[S 140. **Heat.** Thermometry; heat transfer; equations of state; kinetic theory of gases; thermodynamics.] Not given in 1928.

S 400. **The Theory of Relativity.** Credit two hours. Prerequisite a thorough general course in physics and calculus. Daily except Sat., 12. *Rockefeller C.* Professor SWANN.

Historical introduction and aether drift experiments: the Lorentzian transformation and its consequences; 4-vectors and 6-vectors: relativistic particle dynamics; mass and energy; restricted relativity in relation to gravitation, electrodynamics, dielectric and conducting media, etc.; the significance of the general theory of relativity; the tensor calculus; the Riemann-Christoffel tensor; Einstein's law of gravitation; the principle of equivalence; crucial phenomena; continuous media; general relativity and electrodynamics; critical survey.

S 415. **Special Topics for Investigation.** Students who are prepared to profit by the use of the library and laboratory facilities of the department in the study of some special topic or in investigation will be given an opportunity to do so. This work may be taken in connection with or independently of any of the above courses and will be under the direction of one or more members of the staff, with whom frequent conferences should be arranged. Credit varies with the nature and amount of work done.

For further information regarding opportunities for research and investigation during the summer see the *Announcement of the Graduate School*.

S 500. **Selected Topics.** Two or three meetings each week at hours to be arranged. Professor SWANN.

A discussion course of topics such as the relation of the restricted to the general theory of relativity; possible modifications of classical electrodynamics with a view to enriching their content in the direction of explaining terrestrial magnetism and electricity; a critical study of the relation between mass and energy; a critical analysis of radiation pressure; the significance of definitions in mathematical physics; the significance to be attached to the number of dimensions necessary for the discussion of problems; the use of processes involving laws other than the fundamental laws of algebra; a critical survey of certain fundamental ideas in the matrix theory and in Schrödinger's theory. Topics to be discussed will be selected after conference with the class.

Seminary. Reports and discussions of recent work in Physics. M, 2:30. *Rockefeller C.*

PSYCHOLOGY

S 1. **Psychology.** Credit two hours. Lectures, M T W Th, 9. Professor WELD. Recitations, F, 9. *GS C.* Dr. FELDMAN and Mr. KREEZER.

This course furnishes a general introduction to the study of the normal human mind from the experimental point of view. It opens with a brief discussion of the nature of a scientific psychology, of the problems which such a psychology is called upon to face, and of the methods at its disposal for their solution. It then sets forth in order the facts and laws of mental life as indicated by experiment, beginning with sensation, image, and affection; it passes by way of attention, perception, association, and memory to the highly complex processes of imagination, voluntary action, and thought. Throughout the work use will be made of the unique collection of demonstrational apparatus which composes the equipment of a special laboratory in Goldwin Smith Hall.

Textbook: Titchener, *A Beginner's Psychology*.

S 2. **Attention.** Credit two hours. Daily except Sat., 10. *GS C.* Assistant Professor HELSON.

In this course the applications of attention to advertising, to conjuring and sleight of hand, to hypnosis, to testimony, to efficiency, and to learning, will receive special emphasis. The application will, however, be made only after the student has been grounded in the elementary facts and laws of attention. The development, the conditions, the kinds, and the levels of attention will first be considered; then the experimental investigations will be reviewed; and thereafter the practical considerations will be taken up.

Demonstrations and class-experiments will be used frequently for illustration. No textbook will be prescribed, but the lectures will be supplemented by assigned readings in standard works.

S 3. Memory and Learning. Credit two hours. Daily except Sat., 8. *GS C.* Assistant Professor HOISINGTON.

The chief topics to be treated in this course are: the general nature of memory; the curve of learning; the conditions of impression, association, recall, and recognition; the correlation between different memories and between memory and other mental functions; teaching and the presentation of materials; recitation and examination; "cramming" and efficient study; unusual memories and their conditions; the formation and the breaking of habits; mnemonic schemes and the "training" of memory.

Demonstrations and class-experiments will be made throughout the course. Readings will be assigned in standard texts and monographs to be found in the library.

S 4. Qualitative Laboratory. Credit two hours. M W F, 2:00-4:30. *Psychological Laboratory, Morrill Hall.* Assistant Professor HOISINGTON and Mr. KREEZER.

The purpose of this course is to furnish the student training in psychological method, and to give him a first-hand acquaintance with the contents of his own mind. The laboratory consists of twenty-seven rooms on the upper floors of Morrill Hall, including dark rooms, workshops, and offices. The equipment on the side of apparatus is especially complete, embracing besides the standard pieces for qualitative experiments a great variety of special instruments. The equipment of the research laboratory is also available for demonstrations. Experiments will be performed in vision, audition, and the other departments of sense, in feeling, attention, perception, and idea, and toward the end of the work the student may carry out experiments upon the more complex processes of association and action. The textbook is Titchener's *Experimental Psychology*, vol. i, Student's Qualitative Manual.

S 5. Quantitative Laboratory. Credit two hours. Three afternoons (to be arranged), 2:00-4:30. *Psychological Laboratory, Morrill Hall.* Mr. KREEZER.

This course aims to furnish such training in the psychological methods and in the handling of instruments of precision as will be adequate preparation for research problems. The students will make experimental determinations of the stimulus limens, will attempt verification of Weber's Law in various departments of sense, and will perform at least one experiment by each one of the chief psychophysical methods. Quantitative experiments in special fields may be undertaken in so far as time permits. Textbook is Titchener's *Experimental Psychology*, vol. ii, Student's Quantitative Manual.

Laboratory partnerships must be formed if the work of this course is to be pursued with profit. If, therefore, a partner cannot be found, the student is recommended to register in Course S 7.

S 6. The Imaginative Life. Credit two hours. Daily except Sat., 10. *Morrill 42.* Dr. FELDMAN.

The psychological status of the image; visual, auditory, gustatory, olfactory, and tactual images; the function of imagery in perception, memory, imagination, and thought; individual differences; certain image-formations of special interest: dreams, Bidwell's and Swindle's ghosts, synaesthesia, number-forms, the imagery of mathematical prodigies, and the recently discovered eidetic images of children.

S 7. Experimental Problems. Hours and credit to be arranged. *Psychological Laboratory, Morrill Hall.* Assistant Professor HOISINGTON, Dr. FELDMAN, and Mr. KREEZER.

Courses S 1, S 4, and S 5, or their equivalents, are prerequisites for this course. The work will consist of the original study of certain experimental problems, and will involve both observation and manipulation of instruments.

S 8. General Psychology; Problems and Points of View. Credit two hours. Lectures, T W Th F, 11. Professor WELD. Recitations, M, 11. *GS C.* Dr. FELDMAN and Mr. KREEZER.

This course presupposes S 1 or its equivalent. It presents a survey of the problems and points of view in the entire field of scientific psychology. Beginning with an investigation of typical conceptions of general psychology, the course leads on to the psychology of individual differences, the psychology of the abnormal, animal psychology, psychological development in the race and in the individual, social psychology, and the psycho-technologies.

Textbook: Weld, *Psychology as Science*.

S 9. Psychology of Gestalt. Credit two hours. Lectures and discussions, daily except Sat., 12. *Morrill* 42. Assistant Professor HELSON.

The purpose of this course is to give an insight into the point of view of *Gestalt* psychology. The principles and fundamental assumptions of *Gestalt* theory will be explained and illustrated by reference to typical experiments, after which an attempt will be made critically to evaluate the work of this school.

Prerequisite S 1 or its equivalent. Readings will be prescribed in Helson's *Psychology of Gestalt*.

PUBLIC SPEAKING

ORAL ENGLISH: SPEECH TRAINING: DRAMATICS

All summer courses are planned to meet the special needs of teachers. Either S 3 or S 9 (not both) may be counted as a course in methods approved by the New York State Department of Education for the teachers' certificate.

Students should register with the individual instructors, who will be in their offices on registration day and on the first day of instruction. For further details about registration consult Assistant Professor MUCHMORE, *GS* 27.

For information about advanced work in Speech Training and Phonetics consult Mr. MUCHMORE; in Rhetoric and Public Speaking, Mr. WICHELS, *GS* 25; in Dramatic Production, Mr. DRUMMOND, *GS* 33.

S 1a. Public Speaking. Credit two hours. Daily except Sat., 11. *GS* 236. Assistant Professor WICHELS.

A practical training for speaking in public. Study of delivery, of methods of preparation, and of rhetorical forms, with practice in the delivery of various types of original speeches, and of declamations. High-school teachers will find the methods applicable to their work in public speaking and oral English. Regular students passing S 1a are admitted to the second term of Public Speaking 1.

S 3. Teachers' Course in Oral English and Public Speaking. Credit two hours. Daily except Sat., 12. *GS* 26. Assistant Professor MUCHMORE.

For secondary school teachers of English and public speaking. Aims, problems, standards, and methods in oral English, public speaking, and speech training.

S 4. Rhetorical Theory. Credit two hours. Daily except Sat., 9. *GS* 236. Assistant Professor WICHELS.

For graduates and qualified undergraduates. Lectures, readings, reports, and discussions.

A study of classical works on the art of public speaking, with special reference to the methods of teaching it, and with illustrations from the orators.

S 4a. Seminary in Rhetorical Theory. Hours to be arranged. Assistant Professor WICHELS.

For graduates engaged in the study of special subjects in rhetoric and oratory.

S 8. Voice Training. Credit one hour. Daily except Sat., 10. *GS* 21. Mr. THOMAS.

A fundamental course for teachers of oral English and public speaking. Exercises for the development of pure tone, flexibility, melody and strength of voice, clear enunciation; training for poise and ease of action.

S 8a. Principles of Voice Training and Speech Correction. Credit two hours. Hours to be arranged. Assistant Professor MUCHMORE.

For graduates and other students having sufficient preparation for independent work. Readings in the sciences underlying voice-training and speech-correction, with a critical survey of theories and methods.

S 9. Teachers' Course in Speech Training. Credit two hours. Daily except Sat., 10. *GS* 26. Assistant Professor MUCHMORE.

For secondary and elementary school teachers. A study of English phonetics, pronunciation, voice training, the improvement of speech, and the principles of oral expression.

S 10. Oral Interpretation of Literature. Credit two hours. Three sections: daily except Sat., 10, GS 236, Mr. WOHL; daily except Sat., 11, GS 21, Mr. LENROW; daily except Sat., 12, GS 236, Mr. THOMAS.

Principles of reading, and oral interpretation of literature.

S 30. Dramatic Production. Credit two hours. Daily except Sat., 9. GS B. Assistant Professor HERRICK.

Theory of stage direction; choice of plays; practical phases of production; one-act plays rehearsed; practice with the Summer Theatre. Students in S 30 should take S 10 or offer its equivalent.

S 22. Rural Social Organization—Dramatic Production. Open only to students in the Summer School of Agriculture. Credit two hours. Daily except Sat., 11. GS B. Assistant Professor HERRICK. See p. 75.

S 31. Stagecraft. Credit two hours. Daily except Sat., 10, with additional laboratory hours to be arranged. GS B. Dr. STANTON.

An elementary course in stage theory and practice; the planning of small theatres; design and construction of scenery; lighting; with attention to other contributory crafts and to the related principles of stage direction. Laboratory fee, \$5.

S 40. Seminary in Dramatic Art. Credit two hours. T Th, 2-4, and an additional hour to be arranged. GS 21. Professor DRUMMOND.

For graduates prepared for advanced work in the theory of dramatic production. Readings, reports, and lectures.

S 50. Theatre Practice. No credit; a certificate of attendance will be given for satisfactory completion of the routine. Hours to be arranged. Mr. DUNHAM assisted by the Summer Theatre Staff.

Open to undergraduates and graduates who are taking or have taken one or more of the courses in Dramatic Production, and to other qualified persons by consent of the instructor. Practical stage-management supplementing the work of the courses in Dramatic Production; members of the course will be organized into a staff to assist in the scene-building, painting, lighting, costuming, propping, make-up, stage and house management of the Summer Theatre productions; lecture demonstrations, practice exercises, and special readings. Registration will be taken in the several classes in Dramatic Production during the first week of the session.

The Summer Theatre. Under the direction of Professor DRUMMOND. Assistants: Mr. WOHL, Dr. STANTON, Mr. DUNHAM, and Mr. LENROW.

During the Summer Session weekly performances will be given by the student repertory Summer Theatre Company. Qualified members of the courses in Dramatic Production may compete for places in the casts of Summer Theatre plays. For this work they will register in the regular classes in Dramatic Production during the second week of the session.

Special Lectures and Conferences. Daily except Sat., 3, for the two weeks from July 23 to Aug. 3, Professor HUNT of Swarthmore College will lecture on "The Field of Rhetoric."

Professor Hunt will arrange additional meetings and individual conferences on problems and methods in the teaching of public speaking with regularly enrolled members of the group.

No credit; certificate of attendance will be given for those regularly enrolled.

ROMANCE LANGUAGES

FRENCH

S 1. Elementary Course. Credit four hours. Daily except Sat., 8 and 12. GS 290. Mr. WENZELINS. Entrance credit, one unit.

The object of this course is twofold: first, to give beginners a thorough drill in the essentials of French pronunciation, grammar, and reading; second, to offer

to teachers an opportunity of studying the methods of presentation of these subjects to beginners.

S 2. Intermediate Course. Credit four hours. Daily except Sat., 8 and 12. GS 283. Mr. LE REBELLER.

Entrance credit, one unit. Prerequisite course S 1 or its equivalent.

S 3. Advanced Course. Credit four hours. Daily except Sat., 8 and 12. GS 227. Assistant Professor BISHOP.

Entrance credit, one unit. Prerequisite S 2 or its equivalent.

S 4. Advanced Translation. Credit two hours. Daily except Sat., 9. GS 177. Prerequisite course S 3 or its equivalent. Assistant Professor BISHOP.

S 5. Elementary Composition and Conversation. Credit two hours. Daily except Sat., 11. GS 290. Prerequisite course S 3 or its equivalent. Mr. WENCELINS.

S 9. Advanced Composition and Conversation. Credit two hours. Daily except Sat., 9. GS 283. Professor PUMPELLY.

Rapid translation from standard English texts into French; frequent theme-writing. This course is conducted in French.

S 24. Contemporary French Drama. Credit two hours. Daily except Sat., 11. GS 283. Professor MASON.

Lectures and discussions of special topics, with extensive outside reading and reports.

S 23. Introduction to French Philology. Credit two hours. Daily except Sat., 10. GS 277. Professor PUMPELLY.

[S 24. **Voltaire and His Time.** Credit two hours. Daily except Sat., 10. GS 277. Professor GUERLAC.] Not given in 1928.

Lectures, readings, and reports. Mainly for graduates.

[S 31. **Phonetics.** Credit two hours. Daily except Sat., 9. GS 283. Professor MASON.] Not given in 1928.

Lectures on the basic phonetic laws of French and English; practical exercises in phonetic transcription. This course is especially for teachers of French but is open to all students who wish to study the pronunciation of French.

[S 35. **France of Today.** Credit two hours. Daily except Sat., 12. Professor GUERLAC.] Not given in 1928.

Lectures in French on the social, intellectual, and political life of the present.

S 36. Victor Hugo. Credit two hours. Daily except Sat., 10. GS 245. Mr. LE REBELLER. This course is conducted in French.

S 47. French Seminary. Credit two hours. Daily except Sat., 9. *French Seminary Room, Library.* Professor MASON.

Discussion of special topics in the field of modern French literature. This course is especially for graduate students and candidates for the degree of Master of Arts.

French Lectures. A series of lectures in French dealing with French national life will be given by the members of the instructing staff on Wednesday evenings at 8 o'clock in *Goldwin Smith Hall*, Room 290.

French Conversation. In *Prudence Risley Hall* and in *Sage College* special tables are arranged under competent supervision for conversation in French.

SPANISH

S 1. Course for Beginners. Credit four hours. Daily except Sat., 8 and 12. GS 177. Dr. ROGERS.

Entrance credit, one unit.

S 2. Intermediate Course. Credit four hours. Daily except Sat., 8 and 12. GS 281. Mr. CAMINO.

Entrance credit, one unit.

S 4. Advanced Translation. Credit two hours. Daily except Sat., 9. GS 277. Dr. ROGERS.

S 5. Composition and Conversation. Credit two hours. Daily except Sat., 11.
GS 281. Mr. CAMINO.

Special attention will be given to free composition. The course is conducted in Spanish.

Courses S 4 and S 5 taken together have an entrance credit value of one unit.

S 10. Masterpieces of Spanish Literature. Credit two hours. Daily except Sat., 9. GS 281. Professor DALE.

A brief survey of Spanish literature through a study of representative works. Lectures, outside reading, reports, and discussions.

[S 30. **The Teaching of Spanish.** Credit two hours. Daily except Sat., 10. GS 281.

A course for the discussion of materials and methods in the presentation of Spanish in the secondary schools. Special attention will be given to phonetics, classroom methods, the choice and use of texts, and auxiliary materials.] Not given in 1928.

S 31. Spanish Composition for Teachers. Credit two hours. Daily except Sat., 10. GS 281. Professor DALE.

Rapid review of grammar; conversation, free composition, and phonetics. The course is specially designed for those who wish to prepare for the oral credit examination in Spanish of the State Department of Education.

SUMMER SESSION OF THE LAW SCHOOL

Eleven Weeks, divided into two Terms

COURSES

First term, June 25 to August 1

Contract. Professors THOMPSON and WHITESIDE of Cornell University. Eight hours a week, both terms. Credit six hours.

Property Ia. (Personal Property and the distinction between Personal and Real Property). Professor WILSON of Cornell University. Eight hours a week. Credit three hours.

Suretyship. Professor LLEWELLYN of Columbia University. Six hours a week. Credit two hours.

Mortgages. Professor LLEWELLYN. Six hours a week. Credit two hours.

Partnership. Professor CRANE of the University of Pittsburgh. Eight hours a week. Credit three hours.

Trusts. Professor MAGGS of the University of Southern California. Eight hours a week. Credit three hours.

Insurance. Assistant Professor FARNHAM of Cornell University. Six hours a week. Credit two hours.

Second Term, August 2 to September 7

Contract. (See above.)

Agency. Assistant Professor MERRILL of the University of Nebraska. Six hours a week. Credit two hours.

Taxation. Professor MAGILL of Columbia University. Eight hours a week. Credit three hours.

Sales. Professor GOBLE of the University of Illinois. Eight hours a week. Credit three hours.

Wills. Professor SCHNEBLY of the University of Missouri. Six hours a week. Credit two hours.

Damages. Professor LAVERY of the University of Cincinnati. Six hours a week. Credit two hours.

Bankruptcy. Professor HILKEY of Emory University. Six hours a week. Credit two hours.

For further information address the Secretary of the Cornell Law School, Ithaca, N. Y.

SUMMER SCHOOL OF BIOLOGY

Under the auspices of the New York State College of Agriculture and the Summer Session of Cornell University.

The tuition fee in the Summer School of Biology, regardless of the number of courses taken, is fifty dollars.

STAFF OF INSTRUCTION

PAUL RUFUS BURKHOLDER, A.B., Instructor in Botany.
EARL O. BUTCHER, A.M., Instructor in Histology and Embryology.
OTIS FREEMAN CURTIS, Ph.D., Professor of Botany (Physiology).
ERNEST DORSEY, Ph.D., Instructor in Plant Breeding.
ARTHUR JOHNSON EAMES, Ph.D., Professor of Botany (Anatomy).
HARRY MORTON FITZPATRICK, Ph.D., Professor of Plant Pathology (Mycology).
WILLIAM ARTHUR HAGAN, D.V.M., Professor of Pathology and Bacteriology.
OSKAR AUGUSTUS JOHANNSEN, Ph.D., Professor of Entomology.
BENJAMIN FREEMAN KINGSBURY, Ph.D., Professor of Histology and Embryology.
ROBERT MATHESON, Ph.D., Professor of Entomology.
CLYDE HADLEY MYERS, Ph.D., Professor of Plant Breeding.
LOREN C. PETRY, Ph.D., Professor of Botany.
HUGH DANIEL REED, Ph.D., Professor of Zoology.
WILLIAM CHARLES SENNING, A.B., Instructor in Zoology.
LESTER WHYLAND SHARP, Ph.D., Professor of Botany (Cytology).
JAMES WHAPLES SINDEN, A.B., Instructor in Plant Pathology.
DONALD STUART WELCH, Ph.D., Assistant Professor of Plant Pathology.
KARL MCKAY WIEGAND, Ph.D., Professor of Botany (Taxonomy).
ALBERT HAZEN WRIGHT, Ph.D., Professor of Zoology.
BENJAMIN PERCY YOUNG, Ph.D., Assistant Professor of Zoology.

GENERAL PLANS AND AIMS

The Summer School of Biology was organized to provide instruction of the highest grade in zoology, botany, and allied subjects. All the regular facilities of the University are at the disposal of the student, and as far as possible the staff has been restricted to teachers of professorial rank in the University. The courses are for the most part those given during the regular academic year condensed into a period of six weeks, but not abridged. The work is particularly planned to meet the needs of teachers and graduate students who wish to know, in addition to the subject matter, something of the methods and sources in teaching; but undergraduates also, if sufficiently prepared, will find the courses adapted to their needs. Intensive rather than extensive work is necessarily expected of each student, as the courses are comprehensive. These courses lead toward advanced degrees, and special attention is given to graduate students pursuing research. Students interested in graduate study should, if possible, consult by letter with Professor K. M. Wiegand, representing the School of Biology, or with the professor concerned, before coming to Ithaca.

The intensive interest in Biology at Cornell University over a period of years has resulted in a wealth of laboratory material. Very extensive and in some cases unique collections of both plants and animals, and a very complete working library, are available to students prepared to make use of them. Ithaca is located in the

Finger Lakes region of Central New York, noted not only for its picturesque beauty, but for its richness in biological material of both plants and animals. In this respect the University is perhaps not excelled by any other institution in the country. The collecting grounds are for the most part adjacent to the campus, and can be very readily visited. Within easy reach of the laboratories are fresh-water marshes and lakes, salt springs, marl springs, marl bogs, peat bogs, extensive ravines with numerous waterfalls, and upland woods or fields overlying either calcareous or noncalcareous sandy or heavy soils. The country shows a considerable variation in elevation, thus giving samples of several life zones. It is therefore possible to use as illustrative material those inland organisms which may be obtained most readily by teachers throughout the country for use in their own classes.

[A limited amount of change in the hours scheduled may be made by the staff at the beginning of the session to avoid conflicts. In the case of morning laboratories the student may obtain permission, at the option of the instructor, to be absent for a period to attend a lecture in some other course. The time so lost is to be made up later.]

COURSES DEALING PRIMARILY WITH PLANTS

S 1. General Botany. Credit six hours. Equivalent to Botany 1. Lectures, M T W Th F, 8-9:30. Laboratory, M T W Th F, 9:30-12:30. One personal conference of thirty minutes each week, at an afternoon hour arranged in consultation with the student. Occasional field trips, including at least one all-day trip. The afternoons should be reserved for these trips and the conferences. *Stone.* Professor PETRY and Mr. BURKHOLDER.

This course is designed to furnish a general knowledge of the fundamental facts and principles of plant life. A careful study is made of form, structure, and reproduction of representatives from the principal groups, with a view to orient the student in the plant kingdom, and to acquaint him with the principal evolutionary tendencies exhibited. Considerable attention is given to life processes, particularly in the higher plants, and to information necessary in the prosecution of more advanced or practical work connected with plants and animals. Laboratory fee, \$5.

S 2. Plant Physiology. Credit four hours. Equivalent to Botany 31. Prerequisite course S 1 or its equivalent, chemistry, and permission to register. Lectures, M T W Th F, 12. Laboratory, T W Th F, 9-12. *Stone.* Professor O. F. CURTIS.

This course is designed to acquaint the student with the general principles of plant growth. Topics such as water-relations, photosynthesis, translocation, digestion, respiration, mineral nutrition, and reproduction are studied in some detail and particular emphasis is placed both in laboratory and classroom on discussions of the principles and their application to growing plants. Laboratory fee, \$4; deposit, \$2.

S 3. Taxonomy of Vascular Plants. Credit four hours. Prerequisite course S 1 or its equivalent. Lectures, M T W Th, 8. Laboratory, M T W Th F, 2-5. Several all-day field trips will be arranged. *Stone.* Professor WIEGAND.

A study of the kinds of seed plants and ferns; their classification into genera, families, and orders; and field work on the local flora. Emphasis will be placed on wild plants, but the more common cultivated plants will have some attention. The course is planned to follow Course 1 and to furnish an introduction to the knowledge of field botany and to the classification of the higher plants, in preparation for special work in various departments and as an aid in teaching. Instruction will be given in herbarium methods. Laboratory fee, \$4; deposit, \$3.

S 4. Comparative Morphology of Fungi. Credit four hours. Equivalent to Mycology 121. Prerequisite course S 1 or its equivalent and permission to register. Lectures, M T W Th F, 9. *Bailey, West Basement.* Laboratory, fifteen actual hours a week, by arrangement. *Bailey, East Basement.* Professor FITZPATRICK and Mr. SINDEN.

An elementary synoptical course designed to acquaint the student with the general field of mycology. Emphasis is placed on morphology and phylogeny, rather than on taxonomy, but abundant opportunity is given for field work. Laboratory fee, \$6; deposit, \$3.

S 5. Plant Anatomy. Credit four hours. Prerequisite course S 1 or an equivalent and permission to register. Laboratory, M T W Th F, 8-11:30. Hours for lectures and recitations will be arranged during these periods. *Stone.* Professor EAMES.

This course is designed to give a working acquaintance with the internal morphology of vascular plants, and emphasis is placed on practice in interpretation and determination of material. It is planned not only for students desiring training in botany, but also for those in applied fields, such as pathology, pomology, and genetics. Laboratory fee, \$5.

S 10. General Plant Pathology. Credit four hours. Equivalent to Plant Pathology 1. Prerequisite Botany S 1 or its equivalent and permission to register. Lectures, M W F, 2. *Bailey, West Basement.* Laboratory, the completion of a minimum of twenty exercises requiring not less than twenty actual hours a week, with personal conferences upon each. Conferences by arrangement. Laboratory at the student's convenience. Assistant Professor WELCH and Mr. SINDEN.

A fundamental course treating of the nature, cause, and control of plant diseases illustrated by studies of the commoner diseases of cultivated crops. Admission limited to twenty students. Laboratory fee, \$4.50; deposit, \$3.

S 19. Special Problems with Plants. Credit two or more hours. Hours to be arranged. In registering for this course the name of the professor with whom the work is to be taken must be stated.

Students who are sufficiently prepared may arrange to engage in the study of some problem or special topic. Such work may lie in the fields of general or taxonomic botany, anatomy, mycology, cytology, plant physiology, plant pathology, or genetics. A member of the staff must supervise the work.

COURSES DEALING PRIMARILY WITH ANIMALS

S 20. General Zoology. Credit six hours. Lectures, M T W Th F, 9, *McGraw* 5. Laboratory, M T W Th F, 2-5. *McGraw* 2A. Field studies to be arranged. Professor REED and Assistant Professor YOUNG.

A comprehensive view of Animal Biology including the principles and nature of structural and functional organization in the animal body, the animal viewed as an organism, the progress of perfection in animals as revealed through the study of living forms, the pathways and principles of evolution, and modern zoological concepts.

S 21. Systematic Vertebrate Zoology and Ecology. Credit four hours. Lectures, Th F, 9 and 12. *McGraw* 7. Laboratory and field work, Th F, 9-12, 2-5, W, 9-1. Some all-day trips are required. Occasionally a field trip 5:30 to 8 A. M. or 5-8 P. M., may be substituted for the regular periods. Professor WRIGHT.

Lectures on fishes, amphibians, reptiles, birds, and mammals: their habits, life-histories, coloration, respiration, locomotion, reproduction, and adaptations; together with their classification, nomenclature, characters, and relationships. Laboratory study of the parts employed in the classification of these groups, with training in the identification of two hundred and forty North American species. Field work is partly to give practice in field observations and in ready identification of local vertebrates in their natural environment, and partly to introduce some ecological methods. Textbook: Pratt's *Manual of Vertebrates of the United States*. Laboratory fee, \$3.

S 22. Invertebrate Zoology. Credit four hours. Prerequisite Zoology S 20 or an equivalent and permission to register. Daily except Sat., 9-12:30. Field

trips, laboratory work, and discussions will be arranged during these periods. Assistant Professor YOUNG.

This course is planned to give a more intimate acquaintance with the invertebrates, especially the commoner species found in the vicinity of Ithaca. Methods used in collecting and the study of habitats will be the more important objectives of the field trips. Classification, structure, and life cycles will be emphasized in the laboratory. The discussions will be devoted to topics suggested by field and laboratory observations. Laboratory fee, \$3.

S 23. Comparative Anatomy of Vertebrates. Credit four hours. Lectures, daily except Sat., 8. *McGraw* 5. Laboratory, fifteen hours a week at times to be arranged. Professor REED and Mr. SENNING.

A thorough dissection and study of the several systems of organs in a selected series of vertebrate types. The various systems are considered with reference to their significance in progressive modifications and their bearing upon vertebrate descent. The lectures deal with the problems of comparative anatomy. This course is the equivalent of Animal Biology 11 given during the academic year. Laboratory fee, \$6.

S 26. Histology. The tissues and their histogenesis. Credit four hours. No prerequisite, but previous work in biology, zoology and botany, or physiology is recommended. See under course S 27 for time. *Stimson*. Professor KINGSBURY and Mr. BUTCHER.

For students of biology or those preparing for medicine. The cell and cellular origin of the body; the structure and development of its component tissues. Each student will prepare or receive a series of typical microscopic preparations.

Courses in histology and embryology are given in the histological laboratories in *Stimson Hall*. The department is well equipped for instruction in both subjects, having a large and adequate supply of modern microscopical instruments and an extensive collection of demonstration material for both histology and embryology. Microscopes are furnished by the department. Consultation with the instructors previous to registration is advised. Laboratory fee, \$6.

S 27. Embryology of Vertebrates. Credit four hours. Prerequisite a course in the histology of the tissues or a satisfactory equivalent in other biological work involving training in the use of the microscope. *Stimson*. Professor KINGSBURY and Mr. BUTCHER.

For students of biology or those preparing for medicine. Preparation and study of embryological specimens from all the chief groups of vertebrates. Particular emphasis is placed on the embryology of the chick. The student also acquires a knowledge of special methods useful in embryological work. Laboratory fee, \$6.

The laboratory will be open for work in histology and embryology every morning except Saturday. No formal lectures in histology and embryology are scheduled, since it is planned that the work shall be largely individual, with informal discussions from time to time.

S 30. General Entomology. Credit three hours. Equivalent to Animal Biology 3, or Entomology 12. Prerequisite Biology 1 or Zoology 1 or the equivalent. Lectures, M T W Th F, 10. Practical exercises, M W F, 2-5. *Roberts* 392. Professor MATHESON.

This course includes lectures and demonstrations on the characteristics of the orders and families of insects, with a study of their habits, life-histories, and relations to other animals and to plants. The laboratory work consists of the study of the structure, ecology, metamorphosis, and classification of insects. Field trips to study insects in their natural habitats are an important feature. Each student is required to collect and prepare a typical collection of insects. Opportunities are given for the rearing of insects in the Insectary, and special work is offered to suit the needs of individual students. Textbook: Comstock's *An Introduction to Entomology*. Equipment: a good hand lens, several insect cases, insect pins, and labels. These can all be purchased in Ithaca. Laboratory fee, \$2.50.

S 31. Elementary Morphology of Insects. Credit three hours. Equivalent to Entomology 21. Twenty actual hours a week, by appointment. *Roberts 391.* Professor JOHANNSEN.

This course deals with the external and internal anatomy of several representative insects as the locust, roach, cicada, honeybee, crane-fly, etc. Laboratory fee, \$2.

S 32. Elementary Systematic Entomology. Credit two hours. Equivalent to Entomology 31. Prerequisite course S 31. Fifteen actual hours a week, by appointment. *Roberts 391.* Professor JOHANNSEN.

The principles of wing venation and the classification of the orders and families. Laboratory fee, \$2.

Courses S 31 and S 32 are required of all students who plan to take advanced work in Entomology.

S 35. Histology of Insects. Credit two hours. Must be preceded or accompanied by course S 31. Laboratory, fifteen actual hours a week, by appointment. *Roberts 391.* Professor JOHANNSEN.

Technique in histological methods as applied to insects. Laboratory fee, \$3.

S 39. Special Problems with Animals. Credit two hours or more. Hours to be arranged. In registering for this course the name of the professor with whom the work is to be taken must be stated.

Students who are sufficiently prepared may arrange to engage in the special study of some problem or special topic. Such work may lie in the fields of general zoology, invertebrate zoology, systematic vertebrate zoology, comparative anatomy of vertebrates, ornithology, histology, embryology, general entomology, systematic entomology, economic entomology, or general biology. A member of the staff must supervise the work.

GENERAL COURSES DEALING WITH BOTH PLANTS AND ANIMALS

S 40. Genetics. Credit four hours. Prerequisite elementary botany and plant physiology, or elementary zoology and animal physiology, and permission to register. Courses in cytology and in taxonomic botany and zoology will be found helpful. Lectures, M T W Th F, 8. Laboratory, M W F, 2-4:30. Conferences to be arranged. *Fernow.* Professor MYERS and Dr. DORSEY.

A general introductory course designed to acquaint the student with the fundamental principles of heredity and variation. Special attention is given to the Mendelian interpretation of the facts of inheritance. Among the topics to be discussed are: the physical basis of heredity; of sex; factor linkage; measurement of variation; quantitative inheritance; pure lines; inbreeding and cross-breeding; cytoplasmic inheritance; and mutation; with suggestions as to the relation of genetical principles to eugenics. Laboratory studies of variation and of the laws of heredity as illustrated by hybrid material in plants and by breeding experiments with the fruit fly, *Drosophila*. Laboratory fee, \$3.

S 6. Cytology. Credit three hours. Prerequisite course S 1 or course S 20 or their equivalent, and permission to register. Laboratory, M T Th F, 9-12:30, usually with a conference at 9. *Stone 205.* Professor SHARP.

This course deals with the subject matter, literature, and problems of cytology. The survey of the field is sufficiently inclusive to make the course of value to advanced students in the various branches of biology, while emphasis on certain features gives it a special significance for the geneticist. The conference hour is devoted to a discussion of topics suggested by the laboratory observations and assigned reading. Laboratory fee, \$5.

S 42. General Bacteriology. Credit four hours. Prerequisite some work in microscopy. Lectures, T W Th F, 9. Laboratory, T W Th F, 10-1. *Veterinary College.* Professor HAGAN.

A general introductory course in bacteriology covering the distribution, morphology, biology, and methods of study of micro-organisms. The latter half of this course is concerned with the bacteriology of water, sewage, milk and milk

products, the fermentation industries, and of some of the more important human and animal diseases. The laboratory work is closely correlated with the subject matter of the lectures. After a number of sessions devoted to the development of technique, there follows work on the bacteria of air, water, milk, fermentation processes, and of disease. Laboratory fee, \$10.

METHODS

Arrangements can be made, contingent upon the time of the instructor, for additional instruction in biological technique. This may include instruction in methods of collecting and preparing laboratory and museum material, the technique of hybridization, etc.

RESEARCH

In addition to the professors named as directly connected with the Summer School of Biology, other professors who may be in residence during the summer will supervise graduate students engaged in research: Professor HOPKINS in Plant Physiology; Professors BARRUS, BLODGETT, CHUPP, MASSEY, REDDICK, and THOMAS in Plant Pathology; Professor HERRICK in Entomology; Professor CLAASSEN in Biology; Professor EMBODY in Aquiculture; Professor ALLEN in Ornithology; and Professors BUSSELL, EMERSON, and LOVE in Plant Breeding and Genetics.

OTHER COURSES

Besides the courses here included in the Summer School of Biology, several other courses dealing with plants and animals are given in the summer, and may be found described elsewhere in this pamphlet.

NEW YORK STATE SUMMER SESSION

AT

CORNELL UNIVERSITY

OFFICERS

LIVINGSTON FARRAND, A.B., M.D., L.H.D., LL.D., President of the University.
ALBERT RUSSELL MANN, B.S., A.M., Dean of the Colleges of Agriculture and Home Economics.

ROLLAND MACLAREN STEWART, B.A., Ph.D., Professor of Rural Education and Director of the New York State Summer Session.

CORNELIUS BETTEN, Ph.D., D.Sc., Director of Resident Instruction in the Colleges of Agriculture and Home Economics.

MARTHA VAN RENSSELAER, A.B., Joint Director of the College of Home Economics.

FLORA ROSE, M.A., Joint Director of the College of Home Economics.

OLIN WHITNEY SMITH, B.S., Secretary of the Colleges of Agriculture and Home Economics.

ELLEN FITCHEN, A.B., Secretary in the College of Home Economics.

STAFF OF INSTRUCTION

(The names of the instructors in the College of Agriculture are printed on page 60; those of the instructors in the College of Home Economics, on page 78; those of the instructors in the Summer School of Biology, on page 51.)

COURSES OF INSTRUCTION

Courses of instruction are offered in the New York State Summer Session under the auspices of the New York State College of Agriculture and of the New York State College of Home Economics. These courses are designed primarily to meet the needs of persons engaged in the various forms of educational work concerned with agriculture, home economics, science, and other subjects of study particularly related to the problems of rural life. Teachers, supervisors of instruction, superintendents or principals of schools, extension workers, parents, dietitians, students interested in the study of farm and home practices, camp directors, and others responsible for the improvement of rural workers have primary consideration in the program of courses.

ADMISSION

Admission to classes, including the special unit courses listed on page, 77 is limited to regularly registered students. No examinations are required for entrance, but the candidate for admission must show that he is qualified to pursue the work offered. He must register for all courses that he expects to attend whether or not he wishes credit. Advice for registration is given through regular advisers who are members of the Summer Session staff, and who approve the registration cards. See page 59 for the directions about registration.

The graduate student should advise with the representative of his major subject if he is matriculating for a degree; or with an adviser selected by the student from the members of the Faculty representing his field of work, if he is not a candidate for a degree. See page 6 of the 1927-28 *Announcement of the Graduate School*. Note the University regulation concerning vaccination on page 6 of the same announcement. Students expecting to matriculate in the University at the opening of the Summer Session should bring a certificate of vaccination. See page 17.

TUITION AND FEES

Tuition in any of the courses offered in the New York State Summer Session except those in the Summer School of Biology, see page 51, is free to admitted students who are residents of New York, and who have been residents for at least one year immediately preceding registration. An incidental fee of ten dollars is, however, charged to all students. Persons coming from outside of the state of New York, whether they take one course or more, will pay fifty dollars but will not pay the incidental fee. For the time and place of payment, see page 13.

In certain courses laboratory fees are charged. These are indicated in the descriptions of the courses. Fee cards must be secured from the instructor at the first exercise, and must be returned to him receipted within five days.

Graduate students who register in the Summer Session as candidates for advanced degrees are required to pay at entrance the matriculation fee of ten dollars in addition to the regular tuition fee of the session (see *Announcement of the Graduate School*), and if registered for study under Personal Direction during the intersemester periods are required to pay an additional administration fee of ten dollars.

In the Summer School of Biology, see page 51, the tuition is fifty dollars for all students including residents of New York.

A fee of two dollars is charged to all summer students for the privileges of Willard Straight Hall. See page 18.

ACADEMIC CREDIT

A student who has previously satisfied the entrance requirements for the College in which he wishes credit may obtain credit for work in the New York State Summer Session up to a limit of eight semester hours. Rarely, however, should students plan to register for more than six semester hours. Students are not permitted to visit classes but may register for courses which they desire to attend without credit, provided the instructor is willing. Residence credit is given if six hours are passed, but not more than a total of two semesters of residence may be obtained by attendance at summer sessions.

Candidates for degrees should consult the announcements of the respective colleges, since much of the work required for degrees, if

offered in the Summer Session at all, is distributed over a period of years. For the requirements for the degree of Bachelor of Science (eight semesters, 120 hours, etc.) see the announcements of the New York State College of Agriculture and the New York State College of Home Economics. For advanced degrees see the *Announcement of the Graduate School*.

DIRECTIONS FOR REGISTRATION

Students should observe the following directions to simplify registration and avoid confusion:

1. Note on page 13 that Saturday, June 30, is Registration Day. The student should plan to register on that day if possible.
2. Go directly to the office of the Secretary in Roberts Hall and secure a registration card.
3. Take this card to a staff adviser in Roberts Assembly, who will assist in the selection of courses and give further direction if needed.
4. When the selection is completed and the schedule is approved return the card to the Secretary's office for official approval and designation of tuition and fees.
5. Pay tuition and fees at the office of the Treasurer, Room 1, Morrill Hall. See page 13.

SUMMER SCHOOL OF AGRICULTURE

IN THE

NEW YORK STATE COLLEGE OF AGRICULTURE

STAFF OF INSTRUCTION

ARTHUR AUGUSTUS ALLEN, Ph.D.	Ornithology
(Professor of Ornithology)	
ELSA GUERDRUM ALLEN, A.B.	Ornithology
(Instructor in Ornithology)	
ARTHUR W. ASHBY, Hon. M. A. (Oxon)	
Agricultural Economics and Farm Management	
(Lecturer in Agricultural Economics, University College of Wales, Aberystwyth;	
in charge of advisory work in agricultural economics in Wales and	
Monmouthshire)	
THOMAS LEVINGSTON BAYNE, jr., Ph.D.	Rural Education
(Assistant Professor of Rural Education)	
WALTER BOYD BLISS, A.B.	Rural Education
(Formerly Assistant Director, Ohio Department of Education)	
VIRGINIA BONSER.	Rural Education
(Formerly of Michigan State Teachers' College, Ypsilanti)	
JAMES ERNEST BOYLE, Ph.D.	Agricultural Economics and Farm Management
(Professor of Rural Economy)	
WENDELL S. BROOKS, Ph.D.	Rural Education
(President of Courier College, Chicago)	
WILLIAM FRENCH BRUCE, Ph.D.	Rural Education
(Instructor in Education)	
JULIAN EDWARD BUTTERWORTH, Ph.D.	Rural Education
(Professor of Rural Education)	
CARROLL DUNHAM CHAMPLIN, Ph.D.	Rural Education
(Professor of Education, Pennsylvania State College)	
PETER WALTER CLAASSEN, Ph.D.	Biology
(Professor of Biology)	
ANNA BOTSFORD COMSTOCK, B.S.	Rural Education
(Emeritus Professor of Nature Study)	
EMMA CONLEY, B.A.	Rural Education
(Acting Professor of Rural Education)	
RALPH WRIGHT CURTIS, M.S.A.	Floriculture and Ornamental Horticulture
(Professor of Ornamental Horticulture)	
THEODORE HILDRETH EATON, Ph.D.	Rural Education
(Professor of Rural Education)	
RALPH ALMON FELTON, M.A.	Rural Social Organization
(Extension Professor of Rural Social Organization)	
ARTHUR KENDALL GETMAN, B.A.	Rural Education
(State Department of Education, Albany, N. Y.)	
GOLDAN ORLANDO HALL, Ph.D.	Poultry Husbandry
(Assistant Professor of Poultry Husbandry)	
WILLIAM JOHN HAMILTON, jr., B.S.	Biology
(Assistant in Biology)	
EARL VOLCART HARDENBURG, Ph.D.	Vegetable Gardening
(Professor of Vegetable Gardening)	
KARL SNYDER HAZELTINE.	Nature Study
(Assistant Professor, Teachers' College, San Jose, Calif.)	
MARVIN THEODORE HERRICK, Ph.D.	Rural Social Organization
(Assistant Professor of English and Dramatics, University of Illinois)	
EDWIN RAYMOND HOSKINS, M.S.A.	Rural Education
(Instructor in Rural Education)	
CHESTER JERMAIN HUNN, B.S.A.	Floriculture and Ornamental Horticulture
(Assistant Professor of Ornamental Horticulture)	

OSKAR AUGUSTUS JOHANNSEN, Ph.D.	Entomology
(Professor of Entomology)	
PETER PAUL KELLOGG	Nature Study
(Assistant in Nature Study)	
MYRON SLADE KENDRICK, Ph.D.	Agricultural Economics and Farm Management
(Assistant Professor of Agricultural Economics)	
PAUL J. KRUSE, Ph.D.	Rural Education
(Head of the Department of Rural Education)	
CHARLES H. LANE, Ph.D.	Rural Education
(Chief of Agricultural Education Service, Federal Board for Vocational Education, Washington, D. C.)	
CLAUDE W. LEISTER, B.S.	Nature Study
(Assistant in Nature Study)	
LAURENCE HOWLAND MACDANIELS, Ph.D.	Pomology
(Professor of Pomology)	
ROBERT MATHESON, Ph.D.	Entomology
(Professor of Entomology)	
BRUCE LEE MELVIN, Ph.D.	Rural Social Organization
(Acting Professor of Rural Social Organization)	
LUA ALICE MINNS, M.S.A.	Floriculture and Ornamental Horticulture
(Instructor in Floriculture)	
CLYDE B. MOORE, Ph.D.	Rural Education
(Professor of Rural Education)	
RICHARD ALAN MORDOFF, Ph.D.	Meteorology
(Professor of Meteorology)	
WALTER CONRAD MUENSCHER, Ph.D.	Botany
(Assistant Professor of Economic Botany)	
WILLIAM IRVING MYERS, Ph.D.	Agricultural Economics and Farm Management
(Professor of Farm Management)	
ROBERT WALLACE NAFE, M.A.	Rural Social Organization
(Assistant Professor of Rural Social Organization)	
MILTON G. NELSON, Ph.D.	Rural Education
(State College for Teachers, Albany, N. Y.)	
E. LAURENCE PALMER, Ph.D.	Rural Education
(Professor of Rural Education)	
GEORGE ERIC PEABODY, M.S.	Extension Teaching
(Assistant Professor of Extension Teaching)	
MILES DAVID PIRNIE, B.S.	Ornithology
(Instructor in Ornithology)	
JOSEPH PULLMAN PORTER, M.S.A., M.L.D.	Floriculture and Ornamental Horticulture
(Extension Assistant Professor of Ornamental Horticulture)	
SID ROBINSON, B.S.	Biology
(Assistant in Biology)	
LOUIS MICHAEL ROEHL, B.S.	Rural Engineering
(Assistant Professor in Charge of Farm Shop)	
HARRY ALBERT ROSS, Ph.D.	Agricultural Economics and Farm Management
(Professor of Marketing)	
EZRA DWIGHT SANDERSON, Ph.D.	Rural Social Organization
(Head of the Department of Rural Social Organization)	
JAMES MORGAN SHERMAN, Ph.D.	Dairy Industry
(Head of the Department of Dairy Industry)	
RAY P. SNYDER	Rural Education
(State Department of Education, Albany, N. Y.)	
JOHN NELSON SPAETH, M.F.	Forestry
(Research Assistant Professor of Forestry)	
CLIFFORD NICKS STARK, M.A.	Dairy Industry
(Assistant Professor of Bacteriology)	
ROLLAND MACLAREN STEWART, Ph.D.	Rural Education
(Director of the New York State Summer Session and Professor of Rural Education)	

HOMER COLUMBUS THOMPSON, Ph.D.	Vegetable Gardening
(Head of the Department of Vegetable Gardening)	
H. R. TOLLEY, B.S., A.B.	Agricultural Economics and Farm Management
(Senior Agricultural Economist, Bureau of Agricultural Economics, Department of Agriculture, Washington, D. C.)	
GEORGE FREDERICK WARREN, Ph.D.	Agricultural Economics and Farm Management
(Head of the Department of Agricultural Economics and Farm Management)	
ANDREW LEON WINSOR, M.A.	Rural Education
(Head of Department of Education and Director of Normal Training, Weber College, Utah)	
LOUIS EDWARD WOLF, M.S.	Entomology
(Instructor in Entomology)	
PAUL WORK, Ph.D.	Vegetable Gardening
(Professor of Vegetable Gardening)	
JOSEPHINE L. WRIGHT, B.S.	Rural Education
(Formerly of the Barnard School for Boys, Columbia University)	

AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

S 102. Farm Management. Credit three hours. Lectures, daily except Sat., 8. Laboratory, T, 2-4:30; S, all day. *Farm Management 102.* Professor MYERS.

This course is designed for advanced and graduate students. Undergraduates must receive permission to register. It should be preceded by economics and as many as possible of the courses dealing with the production of crops and animals.

Lectures, recitations, and laboratory practice. Farming as a business; types of farming; balance of business; size of business; rates of production; farm layout; building arrangement; labor management; machinery; marketing; ways to begin farming; forms of tenure and leases; choosing and buying a farm; use of capital and credit; planning, organization, and management of specific farms. Field trips on Saturday beginning at 8 A. M. One of the trips will require two days. Laboratory fee, \$2.

S 104. Types of Farming in Great Britain. Credit one hour. Lectures, T Th, 11. *Farm Management 102.* Professor ASHBY.

A study of the types of farming in Great Britain and their economic position.

S 111. Methods and Uses of Statistics. Credit two hours. Lectures, daily except Sat., 10. *Farm Management 102.* Laboratory, M Th, 2-4:30, *Farm Management 102.* Professor TOLLEY.

Classification and tabulation of data; frequency distributions and their description; properties of time series; collection of data and theory of sampling; analysis of relationship.

S 112. Advanced Statistical Analysis. Credit one hour. Lectures, M W F, 8. *Marketing.* Prerequisite Course S 111 or its equivalent. Professor TOLLEY.

Theory, method, and application of correlation analysis for two or more variables; two-variable correlation; multiple correlation; linear and curvilinear relationships.

S 143. Marketing Dairy Products. Credit three hours. Open to juniors, seniors, and graduates. Lectures, daily except Sat., 9. Laboratory, W F, 2-4:30. *Marketing.* Professor Ross.

A study of the economic factors involved in the marketing of dairy products, with special attention to fluid milk. Exchanges; storage; foreign trade; regional competition; analysis of supply and demand; surplus; economic basis of prices; methods of price determination; types of cooperative marketing organizations; marketing policies; sales methods; efficiency factors. Laboratory fee, \$2.

S 143a. Marketing Fluid Milk. Credit one hour. Lectures, daily except Sat., 11, July 23 to August 11. Designed for teachers of agriculture, county agents, and extension workers. *Marketing.* Professor Ross.

A study of the economic factors involved in the marketing of fluid milk. Regional competition; analysis of supply and demand; surplus; economic basis of

prices; methods of price determination; types of cooperative marketing organizations; marketing policies; sales methods; efficiency factors.

S 168. Public Problems of Agriculture. Credit one or two hours. Lectures, daily except Sat., 12. Optional discussion periods, T Th, 4:30. *Farm Management* 102.

A series of lectures on some of the more important problems of agriculture that require governmental or cooperative action. The schedule of lecturers and topics is as follows:

Public Problems of Agriculture. 3 weeks. Professor WARREN.

Taxation. 1 week. Assistant Professor KENDRICK.

Organized Exchanges and Speculation. 1 week. Professor BOYLE.

Cooperative Marketing. 1 week. Professor MYERS.

S 173. Modern History of British Agriculture, 1760-1927. Credit one hour. Lectures, M W F, 11. *Farm Management* 102. Professor ASHBY.

A study of the historical development of British agriculture since 1760. Especial attention will be given to the problems of tenure, taxation, and utilization of land.

S 202. Advanced Farm Management. Credit one hour. Prerequisite Farm Management 102 or its equivalent. Open only to graduate students. Lectures, daily except Sat., 11, July 2 to July 21. *Marketing*. Professor MYERS.

This course is planned for teachers of agriculture in high schools and for county agents who have had a thorough elementary course in farm management.

BACTERIOLOGY

S 1. General Bacteriology. Credit two or four hours. Lectures, daily except Sat., 2. Laboratory, daily except Sat., 3-5. *Dairy* 119. Professor SHERMAN and Assistant Professor STARK.

An introductory course giving a general survey of the field of bacteriology together with the fundamentals essential to further work in the subject. Laboratory fee, \$10, for those taking four credit hours.

BIOLOGY

S 1. General Biology. Credit three hours. Lectures and recitations, daily except Sat., 9. *Roberts* 392. Laboratory and field work, M W F, 2-4:30; other sections by special appointment. *Roberts* 302. Professor CLAASSEN and Mr. ROBINSON.

This course is designed to acquaint the general student and the prospective teacher with the main ideas of biology through selected practical studies of the phenomena on which biological principles are based. Lectures, laboratory work, and field trips will deal with such topics as: interdependence of organisms as illustrated by insects and flowers, insects and galls, etc.; the simpler organisms, such as amoeba, paramoecium, flagellates, and other protozoans; and algae, fungi, bacteria, and slime molds among plants. The study of these simpler organisms will be followed by studies of such plant types as liverworts, mosses, and ferns, and such animal types as hydra, earthworm, and frog. Students completing this course will be given credit for the first term's work in Biology 1 of the regular academic year. Laboratory fee, \$3.50.

S 1a. General Biology. Credit two hours. Not open to students taking Biology S 1. Lectures and recitations, M T Th, 10. *Roberts* 392. Two laboratory periods a week by special arrangement. Mr. WOLF.

This course is designed especially for training-class teachers and is based largely upon the needs of New York State teachers in the public schools. A study of the fundamental facts and principles of plant and animal life. Laboratory work and field excursions will give students an opportunity to get first-hand information about the structure, development, and natural environment of various forms of living organisms. Laboratory fee, \$2.

S 2. Laboratory Methods in Biology. Credit one hour. Conferences and laboratory work, M, 10-11, W, 10-1. *Roberts 302.* Mr. WOLF and Mr. HAMILTON.

This course is open only to teachers of biology who have had considerable training in biological sciences. Instructor's permission necessary for registration.

This course takes up the problem of laboratory technique, the collection and preservation of class material, the general equipment of the laboratory, and other questions encountered in the management of a laboratory. Teachers who wish to study methods of teaching are referred to Course S 126 in Rural Education. Laboratory fee, \$3.

S 3. Advanced Biology. Credit three hours. Lectures, M T Th F, 11. *Roberts 392.* Field work and laboratory exercises, T Th F, 2-4:30. *Roberts 302.* Prerequisite, college biology, botany, or zoology. Professor CLAASSEN and Mr. HAMILTON.

A course dealing with the biological principles of plant and animal life. Heredity, variation, natural selection, mutation, adaptation, life cycle and metamorphosis, are some of the topics for consideration. Special emphasis is placed upon field studies of the ecological relationships of organisms and students should come prepared for field work.

This course, although not identical with the second term biology of the regular year, will be accepted in place thereof. Laboratory fee, \$3.50.

SUMMER SCHOOL OF BIOLOGY

Under the auspices of the New York State College of Agriculture and the Summer Session of Cornell University, there has been brought together a group of courses dealing with the biological sciences. These courses furnish an excellent opportunity for students of the biological sciences to have access to a series of studies from year to year in one of the most appropriate locations in the country. For full information see page 51.

BOTANY

S 13. Trees and Shrubs. Credit two hours. Lectures, Th, 2. Laboratory or field work, T, 2-5, Th, 3-5; also M W, 2-5, if sufficient students register. *Stone.* Dr. MUENSCHER.

A course intended for those who wish to know the woody plants in the field. The aim is to familiarize the student with as many as possible of the trees and shrubs of the Cayuga Lake flora and to teach the main facts of structure, growth, habit, and distribution concerning them. Some all day trips will be required. Laboratory fee, \$1.50; deposit, \$3.

Other courses in the biological sciences are offered in the Summer School of Biology; see page 51.

ENTOMOLOGY

S 12. General Entomology. Credit three hours. Identical with S 30 in the Summer School of Biology. Prerequisite Biology 1, or Zoology 1 or its equivalent. Lectures, daily except Sat., 10. Practical exercises, M W F, 2-4:30. *Roberts 392.* Professor MATHESON.

This course embraces lectures and demonstrations on the characteristics of the orders and families of insects: their habits, life-histories, and relations to other animals and to plants; methods of rearing, studying, collecting, and mounting insects.

The laboratory work will consist in the study of the structure, ecology, metamorphoses, and classification of insects. Field trips to study insects in their natural habitats are an important feature. Each student is required to collect and prepare a typical collection of insects. Opportunities are given for the rearing of insects in the Insectary, and special work is offered to suit the needs of individual students. Textbook: Comstock's *An Introduction to Entomology*. Equipment: a good hand lens, several insect cases, insect pins, and labels. These can all be purchased in Ithaca. Laboratory fee, \$2.50.

S 21. Elementary Morphology of Insects. Credit three hours. Twenty actual hours a week, by appointment. *Roberts 391.* Professor JOHANNSEN. This course deals with the external and internal anatomy of several representative insects, such as the locust, roach, cicada, honeybee, crane-fly, etc. Laboratory fee, \$2.

S 31. Elementary Systematic Entomology. Credit two hours. Prerequisite course S 21. Fifteen actual hours a week, by appointment. *Roberts 391.* Professor JOHANNSEN.

The principles of wing venation and the classification of the orders and families. Laboratory fee, \$2.

Courses S 21 and S 31 are required of all students who plan to take advanced work in the department of Entomology.

EXTENSION TEACHING

S 100. Oral Expression. Credit two hours. Lectures and practice, daily except Sat., 10. *Roberts 131.* Criticism by appointment, daily 8-1. Registration limited to twenty-five students. Open only to upperclassmen and regular summer school students. Assistant Professor PEABODY.

Practice in oral and written presentation of topics in agriculture, with criticism and individual appointments on the technique of public speech. Designed to acquaint students with parliamentary practice, to encourage interest in public affairs, and, through demonstrations and the use of graphic material and other forms, to train for effective self-expression in public.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

S 1. Woody Plant Propagation and Nursery Work. Credit one hour. Lectures, Th, 12, F, 10. Laboratory, W, 8-10:30, S, 10:30-1. Laboratory fee, \$3. *Floriculture and Nursery.* Assistant Professor HUNN.

This course includes the methods of propagation of all classes of ornamental woody plants and their special treatment during the first stages of growth. It also acquaints the student with the principles governing the transplanting of trees, shrubs, and herbaceous perennials, and with the methods practiced in all types of commercial nursery management. Should be accompanied by S 3 and S 4. All members of the class must participate in an excursion to Jackson and Perkins Nurseries, Newark, New York, on August 6.

S 2. Garden Flowers. Credit one hour. Lectures, M, 11, F 8. Laboratory, M, 2-5. *Greenhouses.* Miss MINNS.

This is designed as an elementary course of value in home flower garden or school garden work. It is outlined so as to acquaint students with the most valuable material for this work, and to cover, as time may permit, methods of propagation and culture. Students who elect this course will not be permitted to take Course S 6 for credit. All members of the class must participate in an excursion to the Thompson Estate at Canandaigua on August 4. Laboratory fee, \$1.50.

S 3. Landscape Planting. Credit one hour. Lectures and laboratories, T, 10-1, W, 11-1, Th, 11-1. Should be accompanied by S 6. *Caldwell 400. Greenhouses and Campus.* Assistant Professor PORTER.

A brief course intended to familiarize the student with the best trees, shrubs, and vines for landscape work. Names, characteristics, and requirements will be studied in the field and in the laboratory. The lectures will deal with planting practices and the selection and arrangement of plants. Laboratory fee, \$1.50.

S 4. Landscape Planning. Credit two hours. Lectures and laboratories, Th, 2-5, F, 9-12, S, 8-10:30. Should be accompanied by S 6; either S 3 or S 8 is required. All members of the class must participate in an excursion to Rochester and Canandaigua on August 4 and 5. *Caldwell 400.* Assistant Professor PORTER. Not a professional course.

A discussion of the fundamental principles involved in landscape planning as related to the home grounds, school grounds, and village improvement work. A

brief course intended for students who desire an intelligent point of view but who do not intend to take technical courses. Laboratory fee, \$1.

S 5. Indoor Flower Growing. Credit one hour. Lectures, T Th, 11. Laboratory, T 2-5. *Greenhouses*. Miss MINNS.

The propagation and culture of plants suitable for winter gardens in school-rooms, including a study of containers, soils, fertilizers, insecticides. The selection of varieties of bulbs and methods of culture indoors are considered, as are also the method of propagation and general care of species of plants suited for indoor culture. Laboratory fee, \$1.

S 6. Garden Flowers. Credit two hours. Lectures, M T Th, 9. Laboratory, W F, 2-5. *Greenhouses and Gardens*. Miss MINNS. Laboratory fee, \$2.

This course, planned primarily for graduate and advanced students in floriculture and ornamental horticulture, comprises a study of herbaceous plant materials. The aim is to give the student such an intimate knowledge of these forms of plants as may be used in garden planting, either on home grounds, rural social centers, or public parks, more particularly with reference to summer conditions. Students must have had sufficient botany to be familiar with the botanical characters and classification. An excellent collection of plant material is available for demonstrations. Students who elect this course for credit will not be given credit in S 2. All members of the class will participate in an excursion to the Thompson Estate at Canandaigua on August 4.

S 8. Woody Plant Materials for Landscape Planting. Credit three hours. Lectures, M T Th F, 8. Laboratory and field trip, M T, 10-12:30, W Th, 11-1, M T, 2-5. *Greenhouses and Campus*. Professor CURTIS and Assistant Professor PORTER. Intended for graduate students and advanced students in floriculture and ornamental horticulture. Laboratory fee, \$2.

A study of the characteristics and requirements of trees, shrubs, and vines for landscape planting. The laboratories and field trips enable the student to recognize common woody plants. The lectures discuss planting areas, planting practices, and plant materials, in order that the student may learn to see plants not only as growing things but as possible units in designs with which he may be able to improve his surroundings. All members of the class must participate in an excursion to Rochester on August 5 to visit private estates and public parks.

S 9. Summer Propagation. Credit one hour. Lectures and laboratories combined. W F, 2-4:30. *Greenhouse and Nurseries*. Assistant Professor HUNN. Intended for students who have had the beginning course in propagation. See S 1.

Advantage is taken of the summer months to amplify the regular and summer courses in propagation by intensive practice in the summer production of soft wood cuttings and in the budding of nursery stocks. This will include the management of hot beds and the lining-out system followed in the production of stock plants.

FORESTRY

S 1a. Tree Identification and Methods of Caring for Woodlot Crops. Credit one hour. Lectures T Th, 8. Laboratory and field trips, W F, 2-5, S, 8-1, July 9 to 21. *Fernow 122*. Assistant Professor SPAETH.

Identification of the more important timber trees of the Ithaca region; relative values of the various species; care of the woodlot crop during its growth, including weeding, thinning, and improvement cutting; natural reproduction of the forest.

S 1b. Reforestation and Determining Volumes and Values of Woodlot Crops. Credit one hour. Lectures, T Th, 8. Laboratory and field trips, W F, 2-5, S, 8-1. July 23 to August 4. *Fernow 122*. Assistant Professor SPAETH.

Forest planting methods; sources and kinds of stock; species best adapted to typical sites; yields from planted forests; measurement of logs and standing trees; woodlot valuation.

S 4. Forests and Forestry. Credit one hour. Lectures, M W F, 8. *Fernow 122*. Assistant Professor SPAETH.

This course is designed to meet the requirements of all who wish an elementary knowledge of forestry.

Topics to be considered; the nature and scope of forestry; the economic importance of forests to the nation, including the influence of forests on stream flow and the relation of the forest to recreation; the forest as a biological unit; methods employed in the perpetuation of forests; brief description of the forest regions of the United States; the present status of Federal, State, and private forestry.

This course should be helpful to teachers in secondary schools whose syllabuses in Biology, Civics, Economics, Physical Geography, and General Science include forestry topics.

METEOROLOGY

S 1. Meteorology and Climatology. Credit two hours. Lectures and discussions, daily except Sat., 10. *East Roberts* 222. Professor MORDOFF.

This course is adapted to the needs of teachers and students of subjects in which weather and climate are important factors, particularly teachers of physical geography and general agriculture. It is designed to acquaint the student with the laws governing the primary and secondary circulation of the atmosphere and with the development, progression, and conditions that attend cyclones, tornadoes, and other atmospheric phenomena. Attention is given to the principles and practice of weather forecasting from weather maps and from local observations.

S 2. Meteorology and Climatology, Laboratory Course. Credit one hour. W F, 2-4:30, or other periods to be arranged. Must be accompanied by Course S 1. *East Roberts* 341. Professor MORDOFF.

The work consists in the study of the principal weather and climatic elements with the aid of maps, charts, and instruments. The various meteorological instruments will be studied, as well as the methods of taking and recording the observations.

NATURE STUDY

S 2. Nature Literature. Credit two hours. Lectures, M W F, 12. Laboratory periods to be arranged. *Roberts* 252. Professor COMSTOCK.

Only those who have had course S 7a or its equivalent are eligible. The course includes discussions of nature study reference books, nature story writers, and nature essayists and poets.

S 7a. General Nature Study. Credit two hours. Lectures, M W F, 10. *Fernow* 122. Field and laboratory observations, T Th, 10-12:30, or 2-4:30, *Fernow* 8. Professor PALMER, Professor COMSTOCK, Mr. HAZELTINE, Mr. LEISTER, and Mr. KELLOGG.

To acquaint teachers with the principles and methods of education through nature study and to give them practice which will permit them to carry on the work independently. As many as possible of the laboratory periods will be spent in the fields in the study of birds, trees, plants, and insects; students expecting to take the course should keep this feature in mind. The program adopted by the *Cornell Rural School Leaflet* since January, 1920, will be followed in lectures and the exercises will include practical methods for conducting nature study in graded and ungraded elementary schools. Laboratory and field work open only to those taking the work for credit.

S 109a. The Nature-Study Movement and Its Makers. Credit one hour. Prerequisites, Rural Education Courses, 111, 121, and 7 or their equivalents. M W F, 11. *Fernow* 16. Professor PALMER.

Discussions of the history of the nature movement, with special consideration of its present status in the United States. A review of the methods followed in outlines planned for state and for local use.

S 126. Science in the Rural Secondary Schools. Credit two hours. Daily except Sat., 9. *Fernow* 16. Professor PALMER.

A study of the science program in rural high schools; the functions of the recognized high school sciences such as general science, biology, zoology, physics, chemistry, and physical geography, together with methods of teaching. De-

signed primarily for experienced teachers. Teachers will find it useful in connection with this course to take in addition at least one hour's work in Biology S 2, see page 64, where problems in laboratory practice and technique will be presented.

ORNITHOLOGY

S 11. Ornithology. Credit three hours. Lectures, M W F, 11. *McGraw* 5. Laboratory, M W, 2-5, or T Th, 2-5. Field work, M W, or T Th, 5:30-8 A. M. Professor ALLEN, Mrs. ALLEN, and Mr. PIRNIE.

This course gives an introduction to the study of birds and familiarity with the local species. The lectures cover such subjects as classification, migration, coloration, song, nest-building, eggs, care of young, methods of attracting birds, and their economic importance. The laboratory work with bird skins gives an intimate knowledge of the birds of Eastern North America and familiarity with the use of a manual. The aim of the field work is the identification of birds by their songs, as well as by their plumage and habits. Each student should be provided with Chapman's *Handbook of Birds of Eastern North America* and with field or opera classes. Laboratory fee, \$2.

S 131. Applied Ornithology. Credit two hours. Lectures, laboratory, and field work. T Th, 2-5, and other hours by appointment. *McGraw*. Open only to those who are taking the elementary course or who have had its equivalent. Professor ALLEN.

This course is intended to meet the needs of students who plan further study of ornithology. The lectures cover the field open to prospective ornithologists, methods of teaching, preparation of specimens and lantern slides, bird photography, wild life conservation, and game farming. The laboratory and field work will give practical exercises. Laboratory fee, \$2.

POMOLOGY

S 1a. Apple Growing in New York State. Credit one hour. Lectures and practice, daily except Sat., 9, July 23 to August 4, and 8-11, August 6 to August 11. *East Roberts* 108. Professor MACDANIELS.

An advanced course designed primarily for teachers of agriculture, county agents, and apple growers. During the first two weeks emphasis will be placed upon the best cultural methods in the light of recent research. In the third week attention will be given to harvesting, grading, packing, and marketing. Daily laboratories during this week will give opportunity for demonstration and practice in such activities as pruning and grafting, and also in packing if material is available.

S 131. Advanced Pomology. Credit three hours. Open to students who have had some training in pomology and botany. Daily except Sat., 10. *East Roberts* 108. Professor MACDANIELS.

A comprehensive study of the sources of knowledge and opinion about practices in pomology; methods and difficulties in experimental work in pomology, and results of experiments that have been concluded or are being conducted. Chandler's *Fruit Growing* will be used as a text.

S 203. Special Problems in Pomology. Credit two or more hours. Hours to be arranged. Open to graduate students with adequate preparation. *East Roberts* 108. Professor MACDANIELS.

A study of some specific phase of the growth or response of fruit plants or their products. This may involve a critical review of the literature of some special topic, or the student may choose to investigate a phase of the long time research projects under way in the laboratory or the experimental orchards.

POULTRY HUSBANDRY

S 1. Principles and Practices of Poultry Management. Credit three hours. Lectures, M T W Th, 8, *Poultry* 325. Laboratory, T Th, 2-5, *Poultry* 300. Assistant Professor HALL.

Designed primarily for teachers in agricultural high schools and other secondary schools of agriculture. The course consists of twenty-four lecture and discussion periods and twelve practice periods; it includes also a general discussion, with practical applications, of the principles of incubation, brooding, rearing, feeding, illumination; breeding for egg production and standard qualities; sanitation and disease; marketing; housing; and general poultry-farm management.

S 11a. **Selecting Birds for Production.** Credit one hour. Lectures, M W F, 10. *Poultry* 325. Laboratory, M W F, 2-5, *Poultry* 300. July 9 to July 21. Assistant Professor HALL.

A short unit course dealing with the principles and practice of culling, selecting, and judging birds for productive qualities. Designed for persons who are unable to attend the Cornell Judging School or take Course S 1. Persons admitted must be eighteen years of age and must have had previous poultry experience.

S 12a. **Improving Production by Breeding.** Credit one hour. Lectures, M W F, 10, *Poultry* 325. Laboratory, M W F, 2-5, *Poultry* 300. July 23 to August 4. Assistant Professor HALL.

A short unit course dealing with the principles of breeding poultry for egg production and standard qualities, pedigree, hatching, record keeping, and the selection of birds for breeding purposes. Persons admitted must be eighteen years of age and must have had previous poultry experience.

RURAL EDUCATION

DEMONSTRATION SCHOOL

In connection with the courses offered in Rural Education a demonstration school will be conducted at the Forest Home School, near the College Campus, in cooperation with the school authorities there. It will be organized as a rural school offering work in grades one to six inclusive. Informal procedures will be emphasized. It is the plan that special conferences will be arranged from time to time by teachers of the Summer School staff for the discussion of the principles underlying the procedures followed in the school.

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EDUCATIONAL PSYCHOLOGY AND MEASUREMENT

S 111a. **Psychology for Students of Education.** Credit two hours. Daily except Sat., Section 1, 8, *Caldwell* 100. Section 2, 11, *Caldwell* 143. Assistant Professor BAYNE and Mr. WINSOR.

A point of view in psychology for students of education. The nature of man with emphasis on the tendencies to behavior basic to learning. The learning process. Individual differences.

S 111b. **Psychology for Students of Education.** Credit two hours. M W F, 7:30-9 A. M. *Caldwell* 250. Professor KRUSE. Prerequisite S 111a, or its equivalent. Students who have not had S 111a should confer with the instructor before registering for this course.

Following the argument of S 111a, more extended treatment will be given to selected topics in the psychology of learning, such as special aspects of the laws of learning; trial and error in learning; the conditioned response; controlled thinking.

S 115. **Psychology for Students of Child Training.** Credit two hours. Daily except Sat., 11. *East Roberts* 232. Professor KRUSE.

A beginning course in psychology designed for students of child training and for teachers of the primary and intermediate grades. A study of original nature, learning and habit formation, attention, memory, etc., will be made in relation to the development of the child.

S 150. **Mental and Educational Measurement.** Credit two hours. Daily except Sat., 9. *Caldwell* 250. Mr. WINSOR.

A beginning course in measurement designed for students of child training and for teachers of the primary and intermediate grades. A study will be made of individual and group tests in relation to development, diagnosis, and classification of young children.

S 151. **Educational Measurement.** Credit two hours. Daily except S., 10. *Caldwell* 282. Assistant Professor BAYNE.

For teachers in the upper grades of the elementary school and in the high school.

A beginning course in educational measurement. Measurement in relation to the classification of pupils, the determination of the progress of pupils, individual difficulties, and the determination of final marks. Typical tests and scales, and elementary statistical terms and methods will be studied in their relation to the above problems.

EDUCATIONAL METHOD

S 121. **Method and Procedure in Teaching in Elementary Schools.** Credit two hours. Daily except Sat., 10, *Caldwell* 143. Professor CHAMPLIN.

A consideration of the problems of teaching; how to motivate study, cultivate interest, organize teaching materials, select and solve problems, plan class procedure, construct and use questions, drill, measure the results of teaching, etc., to make clear the principles which are fundamental to efficient instruction.

S 125. **The Teaching of Reading.** Credit two hours. Daily except Sat., 2-3:30, *Caldwell* 143. Professor CHAMPLIN.

This course deals with the various phases of the reading process. Attention will be given to diagnosis, remedial work, types of reading, materials suitable for the various grade levels, recent investigations and recommendations. The course is designed for teachers, principals, and supervisors.

S 126. Science in the Rural Secondary Schools. Credit two hours. Daily except Sat., 9. *Fernow 16.* Professor PALMER.

A study of the science program in rural high schools; the functions of the recognized high school sciences such as general science, biology, zoology, physics, chemistry, and physical geography, together with methods of teaching. Designed primarily for experienced teachers. Teachers will find it useful in connection with this course to take in addition at least one hour's work in Biology S 2, where problems in laboratory practice and technique will be presented.

S 132. The Teaching of Agriculture in the High School. Credit two hours. M T Th F, 9. Laboratory, W, 2-4:30. *Caldwell 282.* Mr. HOSKINS.

Designed for teachers of agricultural courses or for students preparing to teach such courses. Students not registered in S 132a are required to take a minimum of three field trips.

A study of the problems confronting the teacher of agriculture; the vocational point of view in instruction; determination of courses of study from field studies and analysis; forms used in teaching; including the selection of materials and their organization for instruction purposes; the relationships of the agricultural teacher to the other agencies of agricultural training in the community.

S 132a. Building Courses of Study in Agriculture. Credit one hour. Daily except Sat., 8. Laboratory, T Th, 1-6, July 9 to 21, *Caldwell 282.* Mr. GETMAN and Mr. HOSKINS.

S 132b. Organizing the Supervised Practice Program. Credit one hour. Daily except Sat., 8. Laboratory, T Th, 1-6, July 23 to August 4. *Caldwell 282.* Mr. GETMAN and Mr. HOSKINS.

Courses S 132a and S 132b are designed for teachers of agriculture who desire intensive unit courses of less than six weeks' duration in practical problems involved in teaching.

S 135a. Teaching Home Economics in the Secondary School. Credit two hours. Daily except Sat., 9. *Caldwell 143.* Acting Professor CONLEY.

This course is particularly concerned with modern methods of education as related to home economics and is designed to assist teachers in improving their methods of teaching. Consideration will be given to problems involved in the determination and construction of home economics curricula, both vocational and elective; analysis of teaching steps in type units of given courses; modern teaching methods; measuring and evaluating the progress of pupils; home projects; coordinating class work with home interests.

S 222. Principles of Method. Credit two hours. Daily except Sat., 11. *Caldwell 282.* Professor STEWART.

Designed primarily for graduate students in vocational education who have had at least one year of teaching experience and who have completed Rural Education S 111a and S 111b or their equivalent.

The course deals with typical situations in teaching agriculture, home economics and science to discover the fundamental principles underlying efficient teaching. The special forms of teaching appropriate to these fields, such as the project, the survey, and the laboratory will receive special attention.

S 226. Foundations of Method. Credit two hours. Daily except Sat. Section 1, 10, *Goldwin Smith 290.* Dr. BRUCE. Section 2, limited to graduate students, 11, *Caldwell 100.* Professor MOORE.

This course is designed primarily for experienced elementary and high school teachers and supervisors. It will include a critical examination of current and proposed educational methods in the light of accepted principles of educational psychology. Special attention will be given to the theories involved in project-teaching. The course will include such topics as the laws of learning, interest and effort, the thinking process, the organization of experience, the relationship between subject matter and the educative process, discipline and moral training.

PREPARATION OF TEACHERS FOR NORMAL SCHOOLS, TRAINING CLASSES, AND COLLEGES

S 141a. The Preparation of Teachers for Rural Schools. Credit two hours. Daily except Sat., 11. *East Roberts* 222. Dr. NELSON.

A course designed for training class teachers. The work will deal with the several problems of developing the curriculum for the training class, with special reference to conditions in New York.

S 245. College Preparation of Teachers of Agriculture. Credit two hours. Lectures, daily except Sat., 8. *Caldwell* 492. Professor EATON.

Open to graduate students of approved experience.

This course is based on a study of the work of teachers of agricultural vocations in the secondary schools. In the light of such study discussion will deal with selective and preparatory requirements—admission; technical, professional, and other courses in the college for prospective teachers of agriculture—and the organization of teaching resources in the professional field.

ADMINISTRATION AND SUPERVISION

S 165. Problems of Rural Education in New York State. Credit two hours. Daily except Sat., 3:30. *Caldwell* 100. Mr. SNYDER.

An analysis of the educational situation in the smaller communities of New York will be made and methods of improvement will be discussed. The purpose of this course is to give a comprehensive survey of the rural school problems of the state including organization and administration, the teaching staff, the curriculum, school finance, community relations of the school, and school buildings.

S 178. The Elementary School Curriculum. Credit two hours. Lectures and discussions, daily except Sat., 9. *Caldwell* 292. Dr. NELSON.

For elementary school teachers and others willing to engage in a critical analysis of the materials included in the several fields.

The following general sub-divisions of the course are indicative of its nature: a brief survey of the educational philosophies of curriculum construction; criteria for the selection and organization of materials; comparative study of types of curricula involving practice in evaluation; the relation of methods and materials; the relation of curricula to types of schools; the responsibility of teachers, supervisors, and administrative officers in curriculum study.

S 261. The Administration of Rural Schools. Credit two hours. Daily except Sat., 11. *Caldwell* 292. Professor BUTTERWORTH.

A consideration of problems in administration for the attainment of these objectives: (1) an understanding of significant questions that face the rural school administrator; (2) a comprehensive view of the organization of education in the state, particularly with reference to the rural situation; (3) the development of principles for the guidance of the administrator in attacking his problems. The approach will be through an analysis of specific administrative difficulties.

S 262e. Rural School Administration. Credit two hours. Daily July 9 to July 21. First meeting, M, 8. *Home Economics* 245. Professor BUTTERWORTH.

Designed especially for the district superintendents of New York State. The work will be organized about the central rural school district and related problems. Two class sessions will be held each day. Lectures, readings, discussions, and special reports. Opportunity will be provided for a few visits to the demonstration one-teacher school and for conferences with its teacher. See page 69.

S 263. Procedures and Technique in Supervision. Credit two hours. Daily except Sat., 8. *Caldwell* 143. Professor MOORE.

Designed for supervisors and for experienced teachers who expect to do supervisory work. It will include a consideration of the nature and purpose of supervision; the improvement of the learning and teaching process; skill in observation; analysis of methods; relationships between general and specific objectives; selection, analysis, and organization of subject matter; measuring and testing results; assisting teachers in professional growth. The experience and needs

of the class will determine the emphasis and nature of treatment of the various aspects of the course.

S 267. Administration and Supervision of Vocational Agriculture. Credit two hours. M W F, 2-3:30. *Caldwell* 282. Professor STEWART, Mr. GETMAN, Dr. LANE.

This course is designed for persons engaged in the supervision of vocational agriculture, or those planning to enter such work. At least two years of teaching experience are a prerequisite. This course should be accompanied or preceded by S 222. The course is devoted to a consideration of administrative and supervisory problems in the field of vocational education in agriculture. Visits to schools in New York State are a required part of the course. If enough members of the class desire it, a trip to adjacent states will be taken after the summer school.

S 269. Supervision and Administration of Home Economics. Credit two hours. Daily except Sat., 10. *Marketing Lecture Room*. Acting Professor CONLEY.

Intended for supervisors and for experienced teachers who are preparing for supervisory positions in home economics. The course is concerned with the analysis of the supervisor's work and with methods of supervision. Among the problems considered will be the organization and administration of home-making departments; departmental budgets; reports; equipment and building plans; principles underlying present-day changes in home economics education; evaluation of teaching; improvement of teachers in service; teachers' conferences and study classes.

SECONDARY EDUCATION

S 17. The Junior-Senior High School. Aims, Organization, and Curriculum. Credit two hours. Daily except Sat., 12. *GS* 264. Professor BROOKS.

Special emphasis will be placed upon the curriculum in its relation to the large aims of the secondary school. The complementary nature of the junior and senior high school will receive particular attention.

S 185. The Rural and Village Principalship. Credit two hours. Daily except Sat., 8. *Roberts* 292. Mr. BLISS.

A course designed for principals and superintendents of consolidated and village schools having both elementary and high school work, and for those preparing for such positions. It deals with such practical problems as the preliminary organization of the school; schedule making and distribution of teaching load; aims and methods of supervision; teachers' meetings; the training of teachers in service; measuring teachers' efficiency; testing, grading, and promotion of pupils; school government; direction and control of extra-class activities, pupil guidance; study supervision; the principal and the community.

S 281. The High School in Rural and Village Communities. Credit two hours. Daily except Sat., 10. *Caldwell* 100. Mr. BLISS.

A course dealing with basic problems of modern secondary education in its adaptation to rural and village conditions; among the topics considered are: the scope and functions of secondary education; present demands upon the rural and village high school; types of secondary school organization and their adaptation to rural and village communities; the curriculum, pupil guidance, extra-class activities, needed forms of extension work.

PHILOSOPHY OF EDUCATION

S 194. Education and Vocations. Credit two hours. Lectures, daily except Sat., 10. *Caldwell* 492. Professor EATON. Open to graduate students and seniors of approved qualification.

This course will consist in discussions of the meaning of vocation and economic organization and the problems of education deriving therefrom—particularly the aims, content, organization, and method generic to the several phases of vocational education.

For courses in Nature Study given under the general direction of Rural Education, see page 67.

For courses in Child Guidance and Child Training, see announcement of courses given by the New York State College of Home Economics, page 79.

For courses in Education in the College of Arts and Sciences, see page 24.

RURAL ENGINEERING

S 41. Farm Shop. Credit two hours. T Th, 2-4:30, and S, 8-1. *Rural Engineering Laboratory.* Assistant Professor ROEHL.

A course for teachers of agriculture in farm carpentry and such correlated drawing as farmers may find helpful in construction and repair work; selection and care of farm shop tools; study of the steel square; tool grinding, saw filing fitting handles, window repairing, painting and refinishing. Special consideration is given to preparing men to teach this work as a part of the vocational course in agriculture. Laboratory fee, \$3.

Students whose programs the hours given above do not fit should see the instructor for special hours.

S 41a. Farm Shop. Credit one hour. *Rural Engineering Laboratory.* Assistant Professor ROEHL.

If a sufficient number desire a course of three weeks' duration, such course will be given from July 2 to July 21 or from July 23 to August 11. Applications should be filed in advance.

S 42. Farm Shop. Credit two hours. M W, 2-4:30, and S, 8-1. *Rural Engineering Laboratory.* Assistant Professor ROEHL.

A course for teachers of agriculture in farm shop work including the following: harness repairing, rope work, soldering, belt lacing, cold metal working, farm blacksmithing. Special attention is given to the selection of jobs, to the best methods of doing these jobs, and to degrees of skill which should be attained in the performance of them. Students will be expected to demonstrate the performance of one such job. Consideration is given to the tool equipment necessary to meet the repairs and construction problems arising on various kinds and sizes of farms. The farm blacksmithing work is confined mainly to such forge work as will aid in the repairing of farm machinery and in the shaping and tempering of cold chisels, punches, picks, harrow teeth, etc. Laboratory fee, \$3.

RURAL SOCIAL ORGANIZATION

S 11. The Sociology of Rural Life. Credit two hours. Lectures and reports Daily except Sat., 9. *Roberts 292.* Acting Professor MELVIN.

The course consists (1) of an examination of the sociological structure of rural life which furnishes the basis for (2) the analysis of rural life problems. Some of the problems considered are health, education, religion, standards of life, the family, government, social life, and recreation. These problems are considered as a phase of community organization and as such are analyzed in their sociological aspects. Students are expected to draw specific material from their own communities.

S 16. Recreational Leadership. Credit two hours. Daily except Sat., 8. Two additional hours in the afternoon each week are required for practice in leading games. Hours to be arranged. *East Roberts 232.* Professor FELTON.

The aim of this course is to prepare students for recreational leadership in schools, granges, churches, and other community meetings. The following subjects are considered: the educational value of play; the periods of childhood and their relations to a course of play and games; play as physical training; play for the development of social relations; play for the formation of habits and character; the place of play in the home; the home playroom and playyard; school playgrounds; community playgrounds; recreation in the program of the church; recreational programs for community halls; and play days in rural schools.

S 21. General Sociology. Credit two hours. Students should have junior standing. Lectures and discussions. Daily except Sat., 11. *Roberts 292.* Acting Professor MELVIN.

The aims of the course are two: first, to study the structure and function of society; and, second, to give an appreciation of processes and forces which may be directed to wholesome societal development. The social structure, activities, influences, controls, and changes as exemplified in both urban and rural life constitute the subject matter of this study.

S 22. The Family. Credit two hours. Daily 10. *Roberts 292.* Professor SANDERSON.

This course considers the social problems of the family both on the farm and in the city; the history of the family, particularly during the past century; the differences between family life in the country and in the city; the function of the family in society; marriage and divorce; relations of parents and children; and how the family may be conserved.

S 23. Dramatic Production. For students in the Summer School of Agriculture. Credit two hours. Daily except Sat., 11. *Goldwin Smith B.* Assistant Professor HERRICK.

The object of this course is an analysis of problems and methods of play production for rural communities. The discussion deals with the choice of play; principles of staging and direction. Some time is devoted to practice in rehearsal, to elementary stage craft, and to make-up.

S 111. Rural Community Organization. Credit two hours. Prerequisite Course 1 or 2. Daily except Sat., 9. *East Roberts 232.* Professor FELTON.

The aim of this course is to help rural teachers, school supervisors, county agents, and other rural leaders in the technique of organizing rural communities for unified, effective community service. Typical communities are analyzed and discussed to arrive at the problems involved and their solution. The methods of local organization in successful communities are studied. The programs of the groups, church, school, farm bureau, home bureau, cooperatives, lodges, and other social and economic institutions are discussed and related to a unified community program.

S 131. The Social Psychology of Rural Life. Credit two hours. For advanced students. Prerequisite S 21 or Economics 50a, one or more courses in psychology, and permission to register. Daily except Saturday, 9. *Roberts 92.* Assistant Professor NAFE.

This course includes a brief history of social psychology and social theories in which the relationship between social psychology and other sciences, especially the social sciences, is discussed. A condensed resume of the psychological endowment of the individual is given from which the principles of social behavior are adduced. Special reference will be made to the psychological problems of rural groups and the course will seek to ascertain how these principles of social behavior can be used in the rational direction of group life.

S 211. The Rural Community. Credit two hours. Primarily for graduate students. Prerequisite Course 1 or 2, or their equivalent. Daily, 11. *Roberts 92.* Professor SANDERSON.

A detailed study of the nature of the rural community; its historical development; a comparative study of types of rural communities; and the methods of community development and organization.

VEGETABLE GARDENING

The courses have been planned to meet the needs of advanced and graduate students from this and other institutions as well as for the secondary teachers who have been served in the past. A program may be chosen entirely in this field or in combination with other subjects. Schedules have been arranged to avoid conflict with certain courses in other departments that have proved of interest to vegetable gardening students. Resident study during the summer and including the Summer School may be counted toward an advanced degree if proper arrange-

ments are made. Those interested in taking graduate work during the summer are requested to consult or correspond with the department in advance.

S 1. Vegetable Gardening. Credit two hours. Lectures, T Th S, 9. *Poultry 174.* Laboratory, F, 2-5, S, 10-1. *Vegetable Greenhouses and Gardens.* Professor WORK.

An introductory course dealing with vegetable plants and the principles of their production, including management, seed and varieties, plant growing, cultural requirements, enemies, grading and handling and returns. The laboratory work will afford opportunity for first-hand acquaintance with the plants and practices. The course is broadly planned rather than narrowly specialized and will serve those who wish a brief introduction to vegetable gardening, whether teachers, college students, or others. There will be one all-day Saturday trip to a vegetable producing section at a cost of \$3 to \$5. Laboratory fee, \$2.

S 2a. Growing Potatoes. Credit one hour. Lectures and practice, daily except Sat., 8-11, and M W F, 2-5, July 2 to July 7. *Poultry 375.* Professor HARDENBURG.

A course designed for teachers of agriculture, county agents, and growers, who wish to give attention for one week to the problem involved in potato growing. Special consideration of types, varieties, diseases, insects, and market demands will be given.

S 101. Advanced Vegetable Gardening. Credit two hours. Prerequisite Course S 1 or equivalent work elsewhere. Lectures, daily except Sat., 10. *Poultry 174.* One conference weekly by appointment. Professor THOMPSON.

A systematic study of results of experiments and research in vegetable production and handling and their application to the solution of practical problems.

This course is planned for advanced undergraduate and graduate students interested in any phase of vegetable work.

S 112. Systematic Vegetable Crops. Credit two hours. Lectures, M W F, 11. *Poultry 174.* Laboratory, T Th, 2-5. *Vegetable Gardens, East Ithaca.* Professor WORK. Laboratory fee, \$2.

Origin, history, taxonomy, types and varieties, improvement problems; description, classification, nomenclature, exhibition, and judging. Leading varieties of the vegetable crops are grown in the gardens supplying material for field study of the plants and types.

This course is planned for any who are interested in the subject whether specializing in Vegetable Gardening or not. It is well for it to be preceded by an elementary course, but this is not essential.

S 221. Special Problems in Vegetable Gardening. Credit two or more hours. Hours to be arranged. Open to graduate students and advanced undergraduates with adequate preparation. *Poultry 174.* Professors THOMPSON and WORK.

A study of some specific topic of the growth of vegetable crops, or of the handling of vegetable products. This may involve a critical review of the literature of some special subject, or the investigation of some special phase of the research products under way in the greenhouse or gardens. Students may, by special arrangement, continue the work throughout the summer.

S 221a. New Problems in Growing and Handling Vegetables. Credit by special arrangement. Daily except Sat., 9. Additional hours to be arranged if desired. July 23 to July 28, *Poultry 174.*

Designed for teachers, county agents, and others who desire to know the newer problems in the growing and handling of vegetables and the nature of their solutions.

SPECIAL UNIT COURSES IN THE SUMMER SCHOOL OF AGRICULTURE

Teachers of agriculture, county agents, and other rural leaders find it difficult frequently to be away from their respective duties for six weeks. Owing to the large number of requests for courses of less than six weeks' duration, a group of courses is offered for the convenience of these workers. See the respective departments for the description of the courses. The courses offered in 1928 are as follows:

	Page
<i>Agricultural Economics and Farm Management</i>	62
S 143a, July 23-August 11. Daily except Sat., 11.	
S 168, July 2-July 21. Daily except Sat., 12.	
S 168, July 23-August 11. Daily except Sat., 12.	
S 202, July 2-July 21. Daily except Sat., 11.	
<i>Forestry</i>	66
S 1a, July 9-July 21. Lectures, T Th, 8. Laboratory and field trips, W F, 2-5, S, 8-1.	
S 1b, July 23-August 4. Lectures, T Th, 8. Laboratory and field trips, W F, 2-5, S, 8-1.	
<i>Pomology</i>	68
S 1a, July 23-August 11. Lectures and practice, daily except Sat., 9, July 23 to August 4; 8-11, August 6 to August 11.	
<i>Poultry</i>	68
S 11a, July 9-July 21. Lectures, M W F, 11. Laboratory Practice, M W F, 2-5.	
S 12a, July 23-August 4. Lectures, M W F, 11. Laboratory Practice, M W F, 2-5.	
<i>Rural Education</i>	69
S 132a, July 9-July 21. Lectures, daily except Sat., 8. Laboratory practice, T Th, 1-6.	
S 132b, July 23-August 4. Lectures, daily except Sat., 8. Laboratory practice, T Th, 1-6.	
S 262e, July 9-July 21. Hours to be arranged.	
<i>Rural Engineering</i>	74
S 41a. Farm Shop, July 2-July 21, or July 23-Aug. 11, if sufficient number desire it.	
<i>Vegetable Gardening</i>	75
S 2a, July 2-July 7, daily except Sat., 8-11, 2-5.	
S 221a, July 23-July 28, daily except Sat., 9. Additional hours to be arranged.	

SUMMER SCHOOL OF HOME ECONOMICS

IN THE
NEW YORK STATE COLLEGE OF HOME ECONOMICS

STAFF OF INSTRUCTION

MIRIAM JANE BARTLETT, Ph.B., Instructor in Home Economics.
HELEN BULL, M.D., Professor of Home Economics.
MARIE FOWLER, B.S., M.A., Professor of Home Economics.
HELEN MONSCH, B.S., M.A., Professor of Home Economics.
JEAN PATTISON, M.D., Consultant Pediatrician.
ELLA EVERETT PAULUS, B.S., Assistant in Home Economics.
MARIE A. REED, Graduate Nurse; Assistant in Home Economics.
KATHERINE REEVES, B.A., Instructor in Home Economics.
RACHEL SANDERS, B.S., Assistant in Home Economics.
RUTH JEAN SCOTT, B.S., Assistant Professor in Home Economics.
MARTHA VAN RENSSELAER, A.B., Professor of Home Economics and Director of the College.
ETHEL B. WARING, Ph.D., Professor of Home Economics.

COURSES OF INSTRUCTION IN THE COLLEGE OF HOME ECONOMICS

FAMILY LIFE

Courses in Child Guidance form part of a family life program. They are aimed to promote efficient, harmonious, and wholesome home life, by giving parents, pre-parents, and teachers an understanding of child nature, its needs and its guidance. Since it is impossible to gain adequate practical information about children unless opportunity is offered for observing children, a Nursery School having eighteen children between the ages of two-and-a-half and four-and-a-half years is maintained as a laboratory for courses in child guidance. The children are under the direction of psychologists and experienced nursery-school teachers. In order to maintain highest standards of health and to prevent contagion a trained nurse, present through the morning hours, makes a daily health examination of each child and of each student or other adult who enters the Nursery School. A pediatrician makes a thorough physical examination of each new child who enters. A dietitian directs the feeding of the children. Meetings of the parents of the children in the school are held three times during the summer school. All these activities come under the observation of students registered for courses in Child Guidance. To protect the children it is possible to have but four observers present with them at any one time. This necessarily limits the number of students who may register for courses in Child Guidance in the Summer School, and therefore application for admission to these courses must be made and acted upon in advance of the student's arrival in Ithaca. Successful applicants must have had psychology as a prerequisite.

Students whose applications for courses in Child Guidance have been accepted should report to the instructor in charge of the course for laboratory assignment before completing a program of work.

The first meeting of the parents of Nursery School children will be held Saturday evening, June 30, at 7.30 o'clock, in the Nursery School. Students registered for courses in Child Guidance are expected to be present.

S 101. Principles of Child Guidance (Elementary Course). Registration in this course is limited to twenty students. Credit three hours. Lectures and discussions, daily except Sat., 8. *Home Economics* 100. Laboratory, daily except Sat., one hour by arrangement with instructor. *Nursery School*. Professor WARING, Miss BARTLETT, Miss REEVES, and Mrs. PAULUS.

Prerequisite Rural Education S 115 or the equivalent. The prerequisite in this course provides knowledge of psychological principles. The course itself undertakes to train students to recognize these principles at work in the behavior of children and of adults with children; to evaluate these principles according to their effect in directing the growth of personality traits; to select for any occasion the principle most significant in that particular situation.

Students may not register for lectures only, as lectures and discussions are organized around the directed observation in the Nursery School Laboratory. Laboratory fee, \$7.50.

S 103. Home and School Environment in Child Guidance. Registration in this course is limited to twenty students. Credit three hours. Lectures and discussions, daily except Sat., 3. *Home Economics* 100. Laboratory, daily except Sat., one hour by arrangement with instructor. *Nursery School*. Professor FOWLER, Miss BARTLETT, Miss REEVES, and Mrs. PAULUS.

Prerequisite Rural Education S 115 or its equivalent.

Principles underlying selection, care, and use of materials and equipment; evaluation of the child's response to them and guidance toward his further responses which may promote balanced individual and social growth for pre-school children in home or nursery school. Consideration will be given to such material elements in the child's environment as toys, books, pictures, plastic materials, paint, tools, and nature materials, and the child's response to these.

Students may not register for lectures only, as the lectures are organized around the laboratory observations. Laboratory fee, \$7.50.

S 111. The Family. Credit two hours. Lectures and discussions, daily except Sat., 9. *Home Economics* 100. Professor VAN RENSSELAER.

This course includes a study of the effects of modern social and economic conditions upon the life of the family; of the historical events which have determined these conditions; of standards of family life which should be set as adequate to maintain wholesome living for all members of the family; of ways in which such standards may be set up, measured, and promoted.

S 125. Child Hygiene. Registration in this course is limited to twenty students. Credit one hour. Lectures and discussions, M W F, 10. *Nursery School*. Laboratory, as occasion demands, by arrangement. *Nursery School*. Dr. BULL.

This course is designed to give the student a fundamental knowledge of the characteristics of the healthy child, of the factors making for positive health; of the common diseases, physical defects, and disturbances which should have medical attention; and of the relation of child health and hygiene to the other trends making for better children.

FOODS AND NUTRITION

S 131. Child Feeding. Laboratory registration in this course is limited to twenty students. Credit two or three hours. Lectures and discussion, daily except Sat., 2. *Home Economics* 100. Laboratory: Section 1, Infant Feeding, T Th 3-5, *Home Economics* 245; Section 2, Feeding Pre-school Children, T Th, 11-1. *Nursery School*. Professor MONSCH, Miss SANDERS.

Prerequisite, a knowledge of general nutrition and dietetics based on previous college courses in these subjects.

Principles underlying the selection, preparation, and serving of right food for children from infancy through adolescence, with special emphasis on the forming of eating habits and attitudes which make for the child's physical, mental, emotional, and social well being. Laboratory fee, \$7.50.

S 110. Clothing for Children. Registration in this course is limited to twenty students. Credit two hours. Laboratory, daily except Sat., 11-1. *Home Economics* 300. Assistant Professor SCOTT.

Prerequisite, courses in color and design, clothing selection and construction.

Principles underlying the selection, care, construction, and alteration of clothing for children, with consideration of the child's needs for activity, his comfort and well being, his preference for color, texture, and design, and his capacities for independent habits in dressing himself. A critical study will be made of available footwear and ready-made garments for children. Laboratory fee, \$7.50.

S 113. Principles of Advanced Clothing Design and Construction. Registration in this course is limited to twenty students. Credit two hours. Laboratory, daily except Sat., 2-4:30. *Home Economics* 300. Assistant Professor SCOTT.

Prerequisite, courses in color and design, clothing design, clothing selection, practice in clothing construction, design and textile selection.

This course will apply the principles of color, design, and the selection of textiles to clothing. Opportunity will be given for modeling on the figure and designing from foundation patterns. Construction of the garments will include efficient methods of workmanship with special attention to details and finishings. Laboratory fee, \$5.

COURSES IN EDUCATION

Attention is called to courses in Rural Education, including courses in Home Economics Education, and Psychology for students of Child Guidance, on page 69; also to additional courses in Education, page 24.

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Announcement of the College of Engineering.

Announcement of the Law School.

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Announcement of the Winter Courses in the College of Agriculture.

Announcement of the New York State College of Home Economics.

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Program of the Annual Farm and Home Week.

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